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A STUDY OF HOME STUDY[1]

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The following report is based upon records from 5,021 grammar- and high-school students in 25 schools or school systems in Virginia as to the amount of time devoted in a typical week to the home preparation of school lessons. Nearly all these schools have been visited by the author, and the standing of the others is well known. They vary in environment, support, supervision, buildings, equipment, number of students, number and preparation of instructors; the totals, therefore, summarize and more or less neutralize the main variations to be expected in good schools in a state, while the local results serve for individual comparisons with schools of similar types. All the schools have been chosen to represent, for their respective types, not only the better class of schools in Virginia, but also the better class of schools in the United States. (A misconception of the better schools of any southern state might be

[1] This is the fourth study in a series on "The School Child's Day." The first three have been collected in *Studies of Mental Fatigue in Relation to the Daily School Program*. The fifth study will be devoted to "School Recesses and Intermissions." The present study will be partly used later in a book on *Home Study* in relation to school hygiene and to family life. Next year the author will publish a descriptive bibliography of the literature in English, German, and French on this subject; and he will greatly appreciate information as to where he can find any published or unpublished data or discussion not yet included.

deduced from the statistics of its entire public-school system, with its large proportion of sparsely settled rural districts and its necessity for separate and as yet comparatively inferior schools for the negroes.)

This report explains the data of the investigation without discussing the general principles involved. A copy of the blank used is herewith printed, with the clear record of a student given in italic. An assistant's calculations of the minutes of study are listed in the lower left margin.

The blanks were printed on light-blue paper of typewriter size and were distributed to the students with a stereotyped explanation by the principals, who had previously been given full interpretation of the necessary directions. A full week's record was required in order to include most of the daily variations in school requirements. The distribution was generally made on a Monday, so that the records could be begun that afternoon or evening and be completed before the students left home for school the next Monday morning, any home study on the morning of the last day being included in the previous Monday's record. The records were made during October, November, and December, 1914; and the week chosen by each school as typical did not include holidays, term examinations, or important school or community functions. The local schools had no expense or labor except to distribute and collect the blanks, which co-operation was willingly given by all invited to participate. The tedious calculation from the individual records of the total 2,283,106 minutes of home study was done by the author with the help of paid assistants; and all averages, medians, percentages, deviations, etc., were worked out by the author alone with a careful system of checking. A little uncertainty at first in the application of rules by assistants rendered advisable the reliance later upon the work of only one.

It was, of course, essential to protect the records against padding. In the first place, principals or teachers could have increased the pressure of lessons in extent or difficulty or given unusual stimuli for work; but a caution against these possibilities met with a ready response from principals, who evidently tried to get records of average conditions. (Some schools to which blanks were sent are

HOME STUDY RECORD

Place, *Hampton*. Name of School, *Hampton High School*. Date when Record Begins, *Dec. 7*. Name of Student, *Elsie Hope Moore*. Age, *13 yrs*. Class in School, *1st grade B High School*.

Put down each day the times in the morning, afternoon, or evening at which you began and at which you stopped your study at home. Give also the subjects you studied during those periods. The following schedules will explain how to do this:

Monday { *5:02–5:30 p.m., History*; *7:55–8:46 p.m., Arithmetic and Geography* } Thursday { *8:05–8:37 a.m., Composition*; *7:48–9:00 p.m., Geometry and Composition* }

If you did not study at home at all on any day, put a naught after that day. Be sure not to let any day pass without putting down some statement about your home study. Your Record will have nothing at all to do with your own marks or reports but will be sent away to make general averages with the Records of several thousand students. Try to make just as true a Record as possible of the amount of time you generally spend at home in preparing your lessons.

	Time	Subjects		Time	Subjects
Monday	*6:40– 6:48 p.m.*	*English*	Thursday	*3:00–4:00 p.m.*	*Arithmetic*
	6:56– 7:46 p.m.	*Arithmetic*		*5:10–5:20 p.m.*	*English*
	8:00– 8:39 p.m.	*History*		*5:45–6:10 p.m.*	*History*
	9:10– 9:59 p.m.	*Latin*		*6:20–6:30 p.m.*	*Spelling*
	10:40–11:00 p.m.	*Literature*			
Tuesday	*8:30– 8:50 p.m.*	*English*	Friday	*7:00–7:30 p.m.*	*History*
	9:05– 9:55 p.m.	*Arithmetic*			
	10:05–10:13 p.m.	*Latin*			
	7:05– 7:13 a.m.	*Literature*			
	7:15– 8:15 a.m.	*History*			
Wednesday	*4:20– 4:40 p.m.*	*Latin*	Saturday	*6:00–6:25 p.m.*	*Arithmetic*
	5:30– 5:45 p.m.	*Spelling*		*6:30–7:00 p.m.*	*English*
				7:00–7:20 p.m.	*Literature*
				7:30–7:45 p.m.	*Latin*
			Sunday		

Answer the following questions with one of the underscored words:

1. Do you generally study at home more, or less, or about the same time as this week's Record shows? *Same.*

2. Do you generally study in a quiet room or in one where other people are talking? *Quiet.*

3. Can you prepare your lessons better at school or at home? *Home.*

4. Would you rather have your present school day longer with more time for study at school, or shorter with less time for study at school, or about the same as it now is? *Same.*

Give any suggestions you may wish to make in regard to your home study. *When you once start your lessons do not keep jumping up but keep your mind on that subject.*

Do you receive help at home in your study? *No.*

If so, by whom is this help given?

On what subjects do you receive help?

not included in this study on account of the insufficient number or incompleteness of the blanks returned.) In the second place, the students could have studied more than usual during the one week in order to impress favorably principal, teachers, or parents. The blank states: "Your Record will have nothing to do with your own marks or report but will be sent away to make general averages with the Records of several thousand students. Try to make just as true a Record as possible of the amount of time you generally spend at home in preparing your lessons." In further explanation the principals were asked to promise the students that their records would not be studied by any member of the faculty; but probably this point was not made as clear to some of the students as it might have been. Every effort was made to make the investigation as impersonal as possible, although the name of the student was required on each record to increase the sense of responsibility for accuracy. Furthermore, these names made possible the separate grouping of the records from boys and those from girls, with their important differences in amount and time of home study. Although a desire for a fairly high record, even without the temptation of personal recognition, may have influenced some students to study longer than usual, with or without their being conscious of the extra time thus spent, there was little reason for, and little evidence of, padding in the accepted records. The many reports of small or even zero amounts show that there was no general desire to make unusual records. Moreover, very few, if any, students dishonestly recorded time which they did not spend in or at study. And this investigation is directly concerned with the amount of time spent in or at study and not with the kind or degree of mental activity of students during this time. An investigation of the latter problem would require many complicated tests with many variables hard to measure; and, moreover, any conclusions regarding this problem would be secondary in importance to the hygienic and family problems involved in the home preparation of school lessons.

The students were not allowed to calculate the amount of time of their home study, as that might have induced padding or mathematical errors, but simply the time by clock or watch at the beginning and end of any consecutive period of study. If records were

made on any other plan, they were discarded. Such a method of recording home study is far more accurate than that of asking students how much time they spend on a given day or on several days, or what is their daily average of home study. This last question promotes guessing. What is needed is a record, not an opinion, and, even in a record, a method that will eliminate student calculation of amounts.

Absence from school or the failure to make a daily record necessitated throwing out a paper; but any record on Friday, Saturday, or Sunday was considered sufficient report on the preparation of Monday's lessons. A naught was anywhere taken as a sufficient record, unless it clearly implied absence from school. If a student reported any study during school hours, this time was not counted unless through mistake. Several papers were discarded for incompleteness as to name or grade, probable padding with extra study, or unintelligible statement of time.

The discussions of Table I and of Tables II and III respectively have been made, with some repetition, complete in themselves, so that they can be read separately by those directly interested in only the grammar school or the high school. Only summaries are here printed of the other tables made as part of this investigation. The first four grades were not included in this study because there is or ought to be very little home study by the younger children and because these children are not mature enough to make out such a record as was required.

Table I gives the average time spent in home study by 2,858 students in 12 grammar schools or school systems, one-fifth of this time being the average spent in the home preparation of lessons for each school day. The averages for grades, sexes, and schools have been made by dividing the total minutes of home study by the total records for each group; but the last vertical column also gives for each school the average of the grade averages, and the last horizontal line also gives for total grades and sexes the average of the school averages. There are also four averages which include directly or indirectly all the 2,858 records: (1) the average of the total records; (2) the average of the grade averages; (3) the average of the school averages of their respective total records; (4) the

TABLE I

Grammar Schools

Average Minutes of Home Study During the Week

	Fifth Grade		Sixth Grade		Seventh Grade		Eighth Grade		Boys		Girls		Total		Average of Grade Averages
	Number Records	Average Minutes	Number Records	Average Minutes	Number Records	Average Minutes	Number Records	Average Minutes	Number Records	Average Minutes	Number Records	Average Minutes	Number Records	Average Minutes	
1. Alberene	.....	.....	15	*258*	11	*275*	.....	.....	9	*158*	17	*322*	26	*265*	*266*
2. Alexandria County	66	*317*	77	*307*	51	*337*	35	*308*	101	*304*	128	*327*	229	*317**	*317**
3. Bristol	35	*276*	42	*285*	36	*565*	.....	.....	49	*302*	64	*425*	113	*371*	*375*
4. Charlottesville	67	*245*	67	*354*	68	*309*	.....	.....	78	*273*	124	*322*	202	*303*	*303*
5. Clifton Forge	42	*595*	26	*450*	38	*535*	.....	.....	43	*497*	63	*566*	106	*538*	*527*
6. Fredericksburg	33	*350*	57	*507*	44	*531*	.....	.....	58	*409*	76	*527*	134	*476*	*463*
7. Harrisonburg	15	*389*	27	*449*	42	*501*	28	*561*	47	*389*	65	*560*	112	*488**	*475**
8*a*. Lynchburg (B)	72	*277*	79	*281*	66	*295*	.....	.....	111	*255*	106	*314*	217	*284*	*284*
8*b*. Lynchburg (F)	47	*289*	49	*284*	69	*271*	.....	.....	74	*273*	91	*285*	165	*280*	*281*
8*c*. Lynchburg (M)	46	*246*	107	*221*	57	*302*	.....	.....	92	*200*	118	*286*	210	*249*	*256*
8*a–c*. Lynchburg	165	*272*	235	*255*	192	*289*	.....	.....	277	*242*	315	*295*	592	*270*	*272*
9. Newport News	64	*375*	103	*425*	54	*327*	.....	.....	87	*353*	134	*409*	221	*387*	*376*
10. Radford	45	*417*	52	*473*	39	*504*	.....	.....	69	*421*	67	*508*	136	*463*	*465*
11*a*. Richmond (B)	64	*293*	49	*259*	42	*318*	.....	.....	68	*237*	87	*329*	155	*289*	*290*
11*b*. Richmond (F)	37	*188*	46	*308*	77	*265*	.....	.....	68	*248*	92	*268*	160	*260*	*254*
11*c*. Richmond (N)	33	*239*	37	*266*	24	*276*	.....	.....	41	*248*	53	*268*	94	*259*	*260*
11*d*. Richmond (P)	91	*288*	62	*362*	70	*343*	.....	.....	80	*261*	143	*362*	223	*326*	*331*
11*a–d*. Richmond	225	*266*	194	*305*	213	*302*	.....	.....	257	*249*	375	*318*	632	*290*	*291*
12. Roanoke	.....	.....	203	*498*	152	*469*	.....	.....	150	*411*	205	*548*	355	*486*	*483*
13. Total	757	*313*	1,098	*368*	940	*377*	63	*420*	1,225	*313*	1,633	*391*	2,858	*358**	*369**
14. Average of local deviations from total	.....	*76*	.....	*86*	.....	*104*	.....	*126*	.....	*88*	.....	*99*	.....	*87*	*81*
15. Average of local averages	.....	*350*	.....	*380*	.....	*412*	.....	*434*	.....	*334*	.....	*427*	.....	*388*	*418*

*Without the eighth grade the total averages for Alexandria County, Harrisonburg, and the grand total are *319*, *464*, and *356* respectively; and the averages of grade averages are *320*, *446*, and *352* respectively.

average of the school averages of their respective class averages. Because opinion may vary as to which of these averages is most representative, all four are given in the table—358, 369, 388, and 418 minutes, respectively. The equalization, without regard to comparative enrolment, of grade representation in (2), of school representation in (3), and of both grade and school representation in (4) makes these averages useful in comparisons to meet various local differences. However, the author considers that (1) is the most useful for general representation of state conditions and indirectly of national conditions. Although the larger school systems have predominant influence in (1) on account of their greater number of records, they are the more highly organized of the systems included and are setting the pace for the state. Average (1) is 11, 30, and 60 minutes, respectively, below (2), (3), and (4), on account of the influence in the latter three respectively of the smaller number of records and the higher averages for the later grades, for the smaller schools, and for both. The average local deviations from the four averages are 87, 81, 85, and 87 respectively—practically the same. Average (1) is referred to in the discussion unless otherwise stated, but all the discussion can be modified by slight and easy changes so as to refer to either (2), (3), or (4).

Only two systems have the eighth grammar grade, the eighth year in the other systems being the first year of a four-year high school. As is shown in the note to the table, if the eighth grammar grade is omitted the local and grand total averages are but slightly changed, although in Harrisonburg this grade is practically the first year of a five-year high school. No records were sought from the fifth grades in Roanoke, as they were distributed in several primary schools; and the fifth grade in the rural school at Alberene did not send separate records from the fourth grade in the same room. More than one school is included in the averages for Alexandria County, Bristol, Newport News, and Radford; the three grammar schools in Lynchburg are given separately for comparison; four of the schools in Richmond have been chosen to represent different social environments, (F) being the most and (N) the least favored. The low similar total averages for Lynchburg and Richmond are probably due to better school study rather than to less total work

by the students. The differences in grade averages in Richmond (F) and (N) are neutralized in the strikingly similar school averages; and the higher averages in (P) are mainly due to the use of the problem method in teaching. The total averages for the three grades in Clifton Forge alone exceed those for Fredericksburg, Harrisonburg, and Radford, where the grades are used for observation and practice by state normal students. The high averages for the sixth and seventh grades in Roanoke are mainly due to the organization of the intermediate school, which also includes the first year of the high school.

The relative increase or decrease of home study from grade to grade shows great local variations; and even in the total averages the increase of 9 minutes in the third year as compared with the second is not consistent with the increase of 55 minutes in the second year as compared with the first. The eighth-grade average is below the seventh in Alexandria County, but in Harrisonburg there is a regular increase throughout the four grades. The fifth- and sixth-grade averages in Charlottesville approximate the superintendent's suggestions to teachers; but the seventh-grade average falls below the sixth, on account of longer study periods in the latter. Generally, the pressure of study requirements in the grammar school varies unevenly and somewhat accidentally with variations in subjects, teachers, or students. This fact shows the need of organized programs of home study, specific as to subject-matter and definite as to average amount of time expected, if not required.

On account of greater accuracy in following directions the sixth and seventh grades are proportionately better represented than the fifth in the accepted grammar-school records, although this effect is somewhat counterbalanced by the failure of more of the older students to hand in records at all. The eighth grammar grade is so unusual in Virginia as to be omitted in this comparison. The percentages by grades of the total accepted records are 27 in the fifth, 39 in the sixth, and 34 in the seventh, while the percentages by grades of the total enrolment in these three grades in the United States are 40, 33, and 27 respectively (calculated from figures in *United States Education Report*, 1914, II, p. xiii). These percent-

ages of records would be changed to 31, 37, and 32 respectively by the omission of the sixth and seventh grades of Roanoke.

Disproportionate grade representation in the accepted records as compared with total enrolment in the United States makes the total averages for schools and for the grand total too high or too low for national representativeness in so far as the grades less represented proportionately in the records have respectively lower or higher averages of home study than those better represented. This is due to the fact that these averages are worked out with records rather than grades as units, the total number of minutes of home study being divided by the total number of records. For instance, the sixth and seventh grades have 45 and 24 per cent more accepted records than the fifth grade, as compared with 18 and 32 per cent less enrolment in the United States; while the average amount of home study in the sixth and seventh grades is 18 and 20 per cent more than in the fifth grade. However, if the grade representation in the records be made proportionate to the enrolment in the United States, by multiplying 1 per cent of the total 2,795 records in these three grades by 40, 33, and 27 respectively instead of 27, 39, and 34, and then by multiplying these results by the respective grade averages of home study, the grand total average is 348 minutes, only 10 minutes less for the week than that in the table—a negligible difference. Furthermore, such changes in grade representation even in local averages make differences of only 5, 8, 9, and 1 minutes less, respectively, in the 4 cities having over 200 records from the 3 grades—Charlottesville, Lynchburg, Newport News, and Richmond. (As mentioned above, in the last vertical column in the table all grade representation is equalized without regard to comparative enrolment.)

Of the accepted grammar-school records 43 per cent are from boys and 57 per cent from girls. There are no statistics as to enrolment by sex in the grammar grades in the United States, but in the total elementary enrolment the sexes are almost equally represented, the boys having 50.53 per cent (calculated from figures on pp. 12 and 411 of the report mentioned). Although the girls spend 25 per cent more time in home study than do the boys, the greater proportionate representation of girls in the grammar-school records

makes little difference in the total averages. If the equal representation of the sexes is accepted for the grammar grades and if the 2,858 records are equalized in representation by multiplying a half by the average number of minutes of home study for boys and girls respectively, the grand total average is 352, only 6 minutes less for the week than that in the table. Furthermore, such equalization of sex representation makes differences even in local averages of only 2, 6, 2, 6, 7, and 20 minutes less, respectively, for the 6 systems having over 200 records from the grammar schools—Alexandria County, Charlottesville, Lynchburg, Newport News, Richmond, and Roanoke.

As the national representativeness of the grammar-school averages in Table I has been shown to be little influenced by the differences in proportionate grade and sex representation, there remains the question how much these averages represent all the students, and consequently the various amounts of home study, in the schools included. Incomplete data indicate that the 2,858 students with accepted records are probably about 55 per cent of the total enrolment in their grades. It is impossible to predict to what an extent records from the students not here included would change the present averages. Though many of these students failed to receive, return, or fill out correctly the records, for reasons not at all related to the amount of home study done by them, there was probably a slightly higher average of indifference and therefore a slightly lower average of home study among those not included than among those that are. A reduction of 10 minutes in the total averages for the week would be ample to accommodate any difference of this kind.

On account of all the above-mentioned considerations, the grand total average (1) need be reduced 5 minutes or less for each school day, and all other averages even less, in order to be fully representative of the types of schools here represented.

The minutes of home study should be related to those of school study in order to get (*a*) the total time devoted to the preparation of lessons and (*b*) the respective proportions of this time spent at school and at home. The averages of school study time were reported to the author by the superintendents or principals of the grammar schools or school systems included in this investigation.

The local averages are only approximate, on account of many local and grade differences in the relations between study and recitation periods, but the total averages are sufficiently representative for the present purpose. The grand total average has been calculated from the result obtained by multiplying the average for each class by the representation of that class in the accepted records. Daily averages are here given in supplementary contrast to the weekly averages in Table I and are as follows for school, for home, and for total study respectively: fifth grade, 82, 63, and 145; sixth grade, 84, 74, and 158; seventh grade, 85, 75, and 160; eighth grade, 67, 84, and 151; grand total, 83, 72, and 155; average of grade averages, 79, 74, and 153. The school study time is throughout more than the home study time, except in the two eighth-grade systems here included. Noticeable are the very slight increases in the amounts of school and of home study from the fifth through the seventh grade.

No general conclusion can be drawn from these data as to whether a school above the total average school study time would be above or below the total average home study time, or vice versa. A rough illustration will suffice: For the 4 grades and the totals of the 12 schools or school systems here included there are 48 pairs for comparison as to the relation between the total average school study time and the total average home study time; of the 17 grades above the first average, 10 are below and 7 above the second; of the 19 grades below the first average, 7 are below and 12 above the second; of the 6 schools above the first average, 3 are below and 3 above the second; of the 6 schools below the first average, 2 are below and 4 above the second; of the total 48 pairs, 19 are either above or below both the first and the second. Radford and Roanoke are throughout above and Richmond below both the first and the second; Alberene, Charlottesville, and Lynchburg are throughout above the first and below the second; Fredericksburg and Clifton Forge are throughout below the first and above the second; the other 4 schools fail slightly to show this agreement.

Altogether, the students in these grammar schools average 1 hour and 23 minutes a day in study at school, 1 hour and 12 minutes a day in study at home, and 2 hours and 35 minutes a day in study

at school and at home. Is the third average too much or too little, and is it properly divided into the first and the second? The answers to these questions depend in a great and, as yet, unmeasured degree upon the course of study, length and arrangement of daily school program, method of teaching, class and age of student, home and social environment. An attempt to postulate general criteria at this time would therefore be premature, especially if extended beyond a given group of local conditions.

Table II gives the average time spent in home study by 2,163 students in 13 high schools, one-fifth of this time being that spent in the home preparation of the lessons for each school day. The averages for classes, sexes, and schools have been made by dividing the total minutes of home study by the total records for each group; but the last vertical column also gives for each school the average of the class averages, and the last horizontal line also gives for total classes and sexes the average of the school averages. There are also four averages which include directly or indirectly all the 2,163 records: (1) the average of the total records; (2) the average of the class averages; (3) the average of the school averages of their respective total records; (4) the average of the school averages of their respective class averages. Because opinion may vary as to which of these averages is most representative, all four are given in the table—583, 610, 636, and 674 minutes, respectively. The equalization, without regard to comparative enrolment, of class representation in (2), of school representation in (3), and of both class and school representation in (4) makes these three averages useful in comparisons to meet various local differences. However, the author considers that (1) is the most useful for general representation of state conditions and indirectly of national conditions. Although the larger schools have predominant influence in (1) on account of their greater number of records, they are the more highly organized of the schools included and are setting the pace for the state. Average (1) is 27, 53, and 91 minutes respectively below (2), (3), and (4), on account of the influence in the latter three respectively of the smaller number of records and the higher averages for the later classes, for the smaller schools, and for both. The average local deviations from the four averages are 115, 118, 113, and 113

TABLE II

High Schools

Average Minutes of Home Study During the Week

	First Year		Second Year		Third Year		Fourth Year		Boys		Girls		Total		Average of Class Averages
	Number Records	Average Minutes	Number Records	Average Minutes	Number Records	Average Minutes	Number Records	Average Minutes	Number Records	Average Minutes	Number Records	Average Minutes	Number Records	Average Minutes	
1. Bristol	24	452	18	534	22	289	8	589	31	363	41	494	72	438	466
2. Cape Charles	13	266	8	643	16	904	9	1,027	17	573	29	778	46	703	710
3. Charlotte	15	922	6	904	11	1,348	3	1,375	14	1,088	21	1,094	35	1,092	1,137
4. Charlottesville	66	603	34	798	30	715	36	663	48	576	118	717	166	676	695
5. Clifton Forge	36	601	26	527	19	827	6	687	31	584	56	641	87	620	660
6. Hampton	27	625	19	501	30	567	14	880	31	485	59	689	90	619	643
7. Harrisonburg	25	854	24	651	13	891	13	595	28	732	47	758	75	751	748
8. Lynchburg	179	456	104	502	54	510	40	464	138	376	239	527	377	477	483
9. Manassas	23	576	23	653	14	807	8	838	32	660	36	698	68	680	718
10. Newport News	63	361	36	542	38	627	10	438	55	334	92	566	147	479	492
11. Radford	45	528	23	508	27	567	12	602	43	460	64	597	107	542	551
12a. Richmond (commercial)	60	404	38	622	19	822	10	687	44	457	83	606	127	554	634
12b. Richmond (elective)	71	459	40	547	34	741	34	696	66	503	113	620	179	577	611
12c. Richmond (Latin)	108	515	67	604	39	763	19	783	97	531	136	655	233	604	666
12d. Richmond (miscellaneous)	25	480	26	413	9	757	12	581	32	478	40	581	72	535	558
12a–d. Richmond (total)	264	479	171	565	101	766	75	698	239	503	372	625	611	577	627
13. Roanoke	131	564	69	631	48	725	34	611	111	527	171	670	282	614	633
14. Total	911	514	561	579	423	689	268	657	818	500	1,345	633	2,163	583	610
15. Average of local deviations from total	.....	132	.....	91	.....	181	.....	163	.....	132	.....	103	.....	115	118
16. Average of local averages	.....	561	.....	612	.....	734	.....	728	.....	560	.....	681	.....	636	674

respectively—practically the same. Average (1) is referred to in the discussion unless otherwise stated, but all the discussions can be modified by slight and easy changes so as to refer to either (2), (3), or (4).

The highest local averages—those for Cape Charles, Charlotte, Harrisonburg, and Manassas—show the effort made by students in small but ambitious schools to make up by more self-instruction for less school instruction and equipment and to reach or even exceed the standards of the better supported schools.

The Richmond records, at the request of the principal, were divided according to courses. The number of records and the total averages of home study decrease respectively in the Latin, elective, commercial, and miscellaneous groups, the latter including the manual arts, modern language, and scientific groups. The total averages for the four courses are fair indices of their comparative home study requirements and, to that extent, of their approach to the theoretical equality of total work required in each.

The relative increase or decrease of home study from year to year shows great local variations; and even in the total averages the increase of 110 minutes in the third year as compared with the second is not consistent with the increase of 65 minutes in the second year as compared with the first. The decrease of 32 minutes in the fourth year as compared with the third is mainly due to the opportunity in some schools, of which many students can avail themselves by previous good work, to take one less course and have one more study period in the Senior year. Generally the pressure of study requirements in the high school varies unevenly and somewhat accidentally with variations in subjects, teachers, or students. This fact shows the need of organized programs of home study, specific as to subject-matter and definite as to average amount of time expected, if not required.

The increase from an average of 377 minutes in the seventh grade (420 in the two eighth grades) to an average of 514 in the first year of the high school is evidence of the often discouraging change in quantity and quality of school requirements when a student passes from the grammar to the high school. In the 9 localities from which both schools are included in this investigation,

the 834 seventh-grade (eighth in Harrisonburg) records average 367 minutes for the week, and the 833 first-year high-school records average 505 minutes. (The almost equal number of records in the second group as compared with the first is due to the addition in the high school of students from other grammar schools.) This increase of 138 minutes can be compared with local increases from 34 in Newport News to 294 in Charlottesville and with a decrease of 113 in Bristol, the average increase in the 9 localities being 115.

The class representation in the records is proportionate to the public high-school enrolment in the United States, the percentages of records being 42 from the first-year class, 26 from the second, 20 from the third, and 12 from the fourth, as compared with the enrolment of 41, 27, 18, and 14 per cent, respectively (*United States Education Report*, 1914, II, 408). As mentioned above, in the last vertical column in Table II all class representation is equalized without regard to comparative enrolment.

The sex representation in the records is 38 and 62 per cent respectively for the boys and the girls, as compared with 44 and 56 in the public high-school enrolment in the United States (calculated from figures on p. 409 of the report). Although the girls spend 27 per cent more time in home study than do the boys, the greater proportionate representation of girls in the high-school records makes little difference in the total averages. If the sex representation be made proportionate to the enrolment in the United States by multiplying 1 per cent of the total 2,613 records by 44 and 56 respectively instead of by 38 and 62, and then by multiplying these results by the respective averages of home study for each sex, the grand total average will be 574 minutes, only 9 minutes less for the week than that in the table. Furthermore, such changes in sex representation make differences even in local averages of only 10, 7, and 7 minutes less, respectively, for the 3 cities having over 200 records from the high school—Lynchburg, Richmond, and Roanoke.

The 2,163 high-school students with accepted records are 51 per cent of the total enrolment of their schools during the first semester of 1914–15 and are probably about 65 per cent of those in attendance at the time the records were made. It is impossible to predict to

what an extent records from the students not here included would change the present averages. Though many of these students failed to receive, return, or fill out correctly the records, for reasons not at all related to the amount of home study done by them, there was probably a slightly higher average of indifference and therefore a slightly lower average of home study among those not included than among those that are. A reduction of 10 minutes in the total averages for the week would be ample to accommodate any differences of this kind.

On account of all the above-mentioned considerations, the grand total average (1) need be reduced 4 minutes or less for each school day, and all other averages even less, in order to be fully representative of the types of schools here studied.

The discussion so far has been based upon averages. But the overemphasis in averages upon extremes is noticeable here, especially as a few students spend very little or very much time in home study. The schools may deserve whatever credit is supposed to be derived from the extra studiousness of a few of their students; but the general tendency in home study is better shown by the medians in Table III, even though they combine differences in class representation. The class medians are not given, as they would be unreliable with the few records for each class in the smaller schools. All the school medians, except one, in the table are less than the averages, owing to the wider range for extreme variations above than below the median. The local differences between medians and averages range from 37 in Radford to 79 in Manassas, the average of the 13 medians being 41 less than the average of the 13 averages. The median of all the 2,163 high-school records is 531 minutes, 52 less than the total average. The average deviation of the local medians from the total median is 121, as compared with the average deviation of 115 of the local averages from the total average. The larger median in Cape Charles is due to the low records in the first year, pulling down the average more than the median, and also to the wide range of the 46 records from 0 to 1,362 minutes, the two figures just below the median being 744 and 675.

In home study investigations with a sufficiently large number of records, the median is to be preferred to the average, especially

until more system in home study programs reduces the range and unevenness of the distribution to more consonance with the variations in capacity and preparation of the students involved. The figures of deviation in the following paragraph emphasize the limited influence the school has over the amounts of home study by individual students.

TABLE III

HIGH SCHOOLS

Deviations of Records from School Averages and Medians

	AVERAGES			MEDIANS		
	Minutes	Average Deviation	Standard Deviation	Minutes	Average Deviation	Standard Deviation
1. Bristol	438	195	245	389	189	246
2. Cape Charles	703	327	382	755	321	386
3. Charlotte	1,092	277	344	1,050	272	347
4. Charlottesville	676	247	312	652	246	311
5. Clifton Forge	620	218	288	555	211	295
6. Hampton	619	218	279	570	211	282
7. Harrisonburg	751	255	313	710	253	318
8. Lynchburg	477	197	247	433	194	351
9. Manassas	680	215	276	601	205	288
10. Newport News	479	219	288	438	216	291
11. Radford	542	172	221	505	170	225
12. Richmond	577	218	282	520	213	289
13. Roanoke	614	249	332	562	243	336
14. Average of schools	636	231	293	595	226	297

Table III gives four measurements of the distribution in each school. In each column the distribution ranges from the lowest in Radford to the highest in Cape Charles. The average deviation of the individual records from their school averages ranges from 172 to 327, the average of the 13 deviations being 231; the average deviation from the medians ranges from 170 to 321, the average being 226. The standard deviations from the averages range from 221 to 382, the average being 293; the standard deviations from the median range from 225 to 386, the average being 297. According to some statisticians, the root-mean-square deviation from the average is the only one to be called a standard deviation, and the root-mean-square deviation from the median has to be separately named; but Table III calls both of them standard deviations from

the origin stated in each case, as being the more suitable term for both in the present comparison.

Table III illustrates the comparative value of averages and medians as central tendencies for the study of distribution. The statistical guides most used in educational study in this country do not discuss the choice of a central tendency or origin from which to compute deviation. Thorndike, Brown, and Whipple imply that both average and standard deviations are generally to be calculated from the average, though other origins can be used if so stated; but they do not discuss the comparative value of these origins. However, the formulae and discussion by Yule[1] give reason for selection. "The root-mean-square deviation is least when deviations are measured from the mean, i.e., the standard deviation is the least possible root-mean-square deviation. . . . . Just as the root-mean-square deviation is least when deviations are measured from the arithmetic mean, so the mean deviation is least when deviations are measured from the median." Of course, the smaller deviation from one origin is only one factor involved in the choice of that origin, as is evident in the previous discussion of the median; but when other considerations are equal, the least deviation is the one to be sought. In Table III all the average deviations from the median are lower than those from the average, and all the standard deviations from the average are lower than those from the median, except those in Charlottesville which are 311.78 from the average and 311.27 from the median. The local differences between the two average deviations range from 1 less from the median in Charlottesville to 10 less in Manassas, the average of the 13 differences being 5 less from the median; while the local differences between the standard deviations range from 0.51 more from the average in Charlottesville to 12 less in Manassas, the average of the 13 differences being 4 less from the average. (In a study of the correlation between the amounts of home study and the marks of students for the month in which this record was made, the author is using the standard deviations from the 4 class averages rather than from the school averages used above.)

[1] *Theory of Statistics*, 1911, pp. 135, 144.

The minutes of home study should be related to those of school study in order to get (*a*) the total time devoted to the preparation of lessons and (*b*) the respective proportions of this time spent at school and at home. The averages of school study time were reported to the author by the superintendents or principals of the high schools included in this investigation. As the high schools generally have 40-minute periods, the school study time is generally a multiple of 40, except in so far as shorter periods for spelling, gymnastics, etc., cut it down. The local averages are only approximate, on account of many differences in the curricula of individual students, but the total averages are sufficiently representative for the present purpose. The grand total average has been calculated from the result obtained by multiplying the average for each class by the representation of that class in the accepted records. Daily averages are here given in supplementary contrast to the weekly averages in Table II and are as follows for school, for home, and for total study, respectively: first year, 94, 103, and 197; second year, 75, 116, and 191; third year, 68, 138, and 206; fourth year, 79, 131, and 210; grand total, 82, 117, and 199; average of class averages, 79, 122, and 201. The school study time is throughout less than the home study time. The total class averages of school study decrease from the first through the third year and rise in the fourth slightly above the second and third, the range of difference being 26 minutes; while the total class averages of home study increase from the first through the third year and fall in the fourth slightly below the third, the range of difference being 28 minutes. These differences somewhat balance each other in the combined totals, the range of difference being 19 minutes.

Although there tends to be a balance between school study and home study time in the total averages, no general conclusion can be drawn from these data as to whether a school above the total average school study time would be above or below the total average home study time, or vice versa. A rough illustration will suffice: For the 4 classes and the totals of the 13 high schools here included there are 65 pairs for comparison as to the relation between the total average school study time and the total average home study time; of the 36 classes above the first average, 18 are

below and 18 above the second; of the 16 classes below the first average, 5 are below and 11 above the second; of the 7 schools above the first average, 2 are below and 5 above the second; of the 6 schools below the first average, 3 are below and 3 above the second; of the total 65 pairs, 31 are either above or below in both first and second. Charlotte and Charlottesville are throughout above both the first and the second; Lynchburg is throughout above the first and below the second; the other 10 schools fail to show this agreement.

Altogether, the students in these high schools average 1 hour and 22 minutes a day in study at school, 1 hour and 57 minutes a day in study at home, and 3 hours and 19 minutes a day in study at school and at home. Is the third average too much or too little, and is it properly divided into the first and the second? The answers to these questions depend in a great, and as yet unmeasured, degree upon the course of study, length and arrangement of daily program, method of teaching, class and age of students, home and social environment. An attempt to postulate general criteria at this time would therefore be premature, especially if extended beyond a given group of local conditions.

It is a matter of considerable hygienic importance to know at what time of the day the home study is done, especially the time relationship between such study and the confinement and book work of school hours. Therefore, for 6 grammar-school systems (Bristol, Charlottesville, Fredericksburg, Harrisonburg, Lynchburg, and Richmond) and 7 high schools (Bristol, Cape Charles, Charlotte, Charlottesville, Harrisonburg, Manassas, and Richmond), representing 1,785 and 1,072 records, respectively, the minutes of study as calculated from each record were so grouped that the percentages could be found of the total minutes done before going to school, in the afternoons of school days, and in the evenings of the entire week by the boys, the girls, and the totals of each school or school system. The percentages of study in the forenoons and afternoons of Saturday and Sunday were calculated separately on account of differences in hours and in hygienic significance from the above-mentioned periods of school days.

In the grammar and high schools, respectively, the home study before school amounted to 3 and 4 per cent, with slightly larger percentages for the boys than for the girls. As this study was generally done after an early rather than before a late breakfast, it can hardly be opposed on hygienic grounds, though in some cases it may decrease the freshness of later school work.

The afternoon study on school days was calculated from school dismissal until six o'clock, an attempt to use the supper time as the later limit proving uncertain in many cases. The time of dismissal ranges from 2:30 to 4:00 P.M. in different communities, 3:00 P.M. being the usual time; and, of course, an early dismissal increases the opportunity for afternoon study at home, as also does a shorter average distance from home. Early dismissal mainly accounts for the larger afternoon percentages in some of the schools; but, on the other hand, the small percentages in the Cape Charles, Charlotte, and Manassas high schools are only in part due to later dismissal, as their larger total amounts of home study make smaller the percentage for any given amount in the afternoon. This second explanation also accounts for the smaller total percentage of 19 in the high schools as compared with 21 in the grammar schools, whereas the high-school students average 119 minutes in the five afternoons as compared with 67 for the grammar-school students. Altogether, the large amount of home study in the afternoons of school days limits the relaxation, exercise, social recreation, and outdoor life so necessary for the student during these two to three and a half hours. The girls suffer more than do the boys in all cases. In the grammar and high schools, respectively, the girls in the five afternoons do 25 and 22 per cent of their much larger totals of home study as compared with 14 and 13 per cent for the boys, making 87 and 147 minutes for the girls as compared with 38 and 72 minutes for the boys. (In a grammar school in a poorer section of Richmond the boys do 1 per cent more but 1 minute less in the afternoon.)

In the grammar and high schools, respectively, the evening percentages were 73 and 70, reflecting inversely the differences in the earlier periods. The smaller percentage for the high schools represents 147 more minutes than the larger percentage for the grammar

schools, and the 69 and 67 per cent, respectively, for the girls represents 25 and 29 more minutes than the 79 and 76 per cent for the boys. As home study is so largely done in the evening, at this time of day center the problems of the kind, amount, manner, and condition of home study in their influence upon the healthful development of school children and upon the associations, interests, and affections of family life. These problems are too extensive to be discussed here.

The records show only chance differences in the amounts of home study done on four school days, but on Friday there is a natural decrease on account of the two holidays to follow. It is interesting to note the percentage of the week's home study done on Saturday and Sunday, especially as in the high schools the parallel reading or composition often accumulates at this time. In these 7 high schools 11 per cent (69 minutes) was done on Saturdays, being 9 per cent (50 minutes) of the boy's total and 12 per cent (80 minutes) of the girls' total; 2 per cent (12 minutes) was done on Sunday, being 4 per cent (22 minutes) of the boys' total and 2 per cent (13 minutes) of the girls' total. The Sunday study is even less in the grammar schools, records of Sunday study from only 5 boys and 3 girls in Lynchburg (B) making a school average of 3 minutes; from 7 boys and 3 girls in Radford making a school average of 4 minutes; from 8 boys and 11 girls in Richmond (F) making a school average of 3 minutes; from 5 boys and 7 girls in Roanoke making a school average of 2 minutes. The students may not have studied this week as much as usual on Sunday, but no suggestion at all was made to influence their records in this matter. (Only a minor part of the Sunday study was done by Jewish students.)

The objections to a full holiday on Saturday, rather than on Monday or rather than two half-holidays during the week, involve the criticisms (1) that the present system encourages study on Sunday and (2) that the total amount of preparation for Monday's recitations is less than that for other school days. The present investigation shows that the first criticism is not widely applicable. The second criticism may be supported or refuted, as the case may be, by comparing the total home study on Friday, Saturday, and Sunday (with the omission of Friday morning and the addition of

Monday morning) with one-fourth of the remainder of the school average for the week, since as large a proportion of the preparation for Monday as for the other school days is probably done at home. For instance, the average minutes of home study on these three days in Lynchburg (B) are 46 as compared with 59 for the other school days—the boys studying 42 as compared with 53, and the girls studying 51 as compared with 66; the average minutes in Richmond (F) are 48 as compared with 53—the boys studying 47 as compared with 50, and the girls studying 48 as compared with 54. But in the high school a larger proportion of the home study on these three days is on parallel or back work not specially required for Monday's recitations; the comparison made for the grammar school is therefore not accurate for the high school. For instance, the average minutes of home study on these three days in the Charlottesville high school are 154 as compared with 130 for the other school days—the boys studying 128 as compared with 112, and the girls studying 165 as compared with 138; the average minutes in the Harrisonburg high school are 161 as compared with 147—the boys studying 162 as compared with 142, and the girls 161 as compared with 149. Of course, the quality of the preparation for Monday may or may not be lessened by the distribution over two or three days and by the natural interference of outside interests; but this investigation deals with the quantity rather than the quality of home study, the latter having to be reached by elaborate tests.

As shown on the blank copied in this report, the students were asked four questions so framed that the single words desired as answers were included and underscored in the questions. This was done to avoid roundabout replies. However, many answers had to be thrown out as doubtful in meaning or as indefinite; for instance, where the answers were "Both" or "Sometimes one, sometimes the other." It must be remembered that answers from young students cannot always be taken as accurate; but the simple facts here asked for were within the students' daily experience, though mistakes in judgment may sometimes have influenced the first answer. Furthermore, the questions were so framed as to suggest no bias in favor of any one of the two or three answers to

each question; and, as was previously stated, every effort was made to have the records filled out as conscientiously and impersonally as possible, without any local school supervision of the result. There was little or no reason why the students should not state real conditions and sincere opinions. The main purpose of the questions was not so much to find out objective facts as to gauge student opinion, because in any successful home study program it is necessary to have the sympathetic co-operation of a large majority of the students. Many other similar questions might have been asked, but it was considered inadvisable to burden the students with a questionnaire requiring numerous detailed answers which they might not be willing or able to give.

The first question—"Do you generally study at home more, or less, or about the same as this week's Record shows?"—is clearly answered by 2,569 grammar- and 1,953 high-school students. The percentages of answers with "More" are 15 and 14 respectively, with "Less," 6 and 6, and with "Same," 79 and 80. The striking similarity in the figures for both schools is noticeable. Either a mistaken but conscientious judgment, or a personal bias, in the comparison of this week's study with that of other weeks, may have influenced the accuracy of a few answers; but the large proportion of "Same" and the overbalancing of "Less" by "More" strengthen the belief that the records as a whole are not padded and are approximately correct reports of usual conditions. Of course these answers are data of different kind and reliability from the actual records of study; but, in expressing student opinion as to the reliability of the records, they give additional scientific value to them. They certainly reflect a general effort to be fair and accurate.

The second question—"Do you generally study in a quiet room or in one where other people are talking?"—is clearly answered by 2,613 grammar- and 2,006 high-school students. The percentages of answers with "Quiet" are 65 and 78 respectively, and inversely with "Talking" are 35 and 22. The students naturally claim as much for their homes as possible; hence, the percentages of "Quiet" might be a little too high, and the omitted answers of "Sometimes quiet, sometimes talking," might be added to increase the percentages of "Talking." Noticeable are (1) the difference between

grammar- and high-school percentages, more high-school students demanding the advantage of quiet study, (2) the superior opportunities in Charlottesville, and (3) the inferior opportunities in the poorer homes of students of Richmond (N).

The third question—"Can you prepare your lessons better at school or at home?"—is clearly answered by 2,756 grammar- and 2,035 high-school students. The percentages of answers with "School" are 35 and 29 respectively, and inversely with "Home" are 65 and 71. It would seem that those students who answered "Talking" to the second question would consistently answer "School" to the third question, and the almost equal percentages of these answers in both grammar- and high-school totals seem to prove this consistency; but, as a matter of fact, there is no uniform tendency for these answers to go together, all four combinations being represented in great numbers. The preponderance of answers in favor of "Home" rather than "School" study shows that the schools have not justified themselves as places for concentration in individual work. A few of the omitted answers suggest that some subjects can be better studied at home, others better at school; but these answers are not sufficiently numerous or definite to warrant any conclusion. Students may think they can study better at home or at school, when actual tests may not support their opinions; but, until reliable tests are made, we must conclude that student opinion is a fair index of the facts, or, at least, that it produces a mental attitude that goes far toward making the facts conform to the opinion. (The author has so far given arithmetic tests in the grammar grades and composition tests in the high school at Harrisonburg, in his approach to the problem of the comparative value of school and home study; but he has not yet corrected the papers.)

The fourth question—"Would you rather have your present school day longer with more time for study at school, or shorter with less time for study at school, or about the same as it now is?"—is clearly answered by 2,759 grammar- and 2,117 high-school students. The percentages of answers with "Longer" are 11 and 11 respectively, with "Shorter," 24 and 24, and with "Same," 65 and 65—the figures being the same for grammar and high schools. On the

whole there seems to be little consistency between the present length of the school day and the desire for shorter time, the schools with earlier dismissal having a smaller average percentage of "Longer" and a larger average percentage of "Shorter." Furthermore, there is not a consistent tendency for the answer "School" to be paired with "Longer," except partially in Alexandria County, or for "Home" to be paired with "Shorter," primarily on account of the dominance of "Same" in the answers to the fourth question. Most of the students prefer the schedule to which they have become accustomed rather than something new. Probably this preference could be changed in favor of a new schedule, even a longer school day, if the students by actual experience could be made to realize its value in extending and improving the opportunities for preparation of lessons at school rather than at home.

The responses to the first request—"Give any suggestions you may wish to make in regard to your home study"—are few and disappointing, most of them being unimportant extensions of answers to one of the four previous questions, or expressions of disapproval (sometimes approval) of the amount of home study in general or in one subject. This disappointing result may be due to the range of the previous questions, limiting further suggestions, or to insufficient interest or originality on the part of the students. For instance, from the 21 responses from Fredericksburg, 48 from Lynchburg (F), and 27 from Richmond (N) no general conclusion can be drawn or specific value gained. These statements apply also to the high-school responses—12 from Charlottesville, 32 from Hampton, 4 from Radford, and 50 from Richmond (elective); but there is occasionally in these answers a better understanding of some of the problems involved, especially distractions at school, explanation and regularity of assignments, agreement between departments as to proportionate requirements, and longer study periods.

The responses to the next request—"Ask your parents to give any suggestions they may wish to make in regard to your home study"—are even more disappointing. The parents were not sufficiently interested or were too reticent to respond, or many students did not show the records to them. From 3 grammar and 2 high schools the responses are 18 from Fredericksburg, 24 from

Lynchburg (F), 4 from Richmond (N), 2 from Charlottesville, and 8 from Richmond (elective), and most of the parents responding express approval either of present arrangements or of the answers of their children. Although home study is more of a home than a school problem and the co-operation of the home is absolutely necessary, the school experts have the responsibility of working out the solution of the many problems involved, and of making suggestions to the home rather than relying upon home advice. Here and there a parent may make a valuable contribution to thought on this subject, especially, and it may be authoritatively, regarding his or her child; but in the study of home study, as in all technical problems, expertness is essential.

In place of a request for suggestions from parents the later blanks distributed had questions to the students as to whether they received help in their home study and, if so, by whom and on what subjects this help was given. From 4 grammar-school systems (Alexandria County, Newport News, Radford, and Roanoke) and 5 high schools (Bristol, Hampton, Newport News, Radford, and Roanoke) 758 replies were received. Since judgment as to the degree of help was not called for in the questions, it being impossible to measure the degree of help without elaborate analysis, any statement that help was received was taken as an affirmative answer, even though many replies were qualified by "Little," "Seldom," and like expressions. In spite of possible bias in favor of minimizing the amount of help, hardly two-thirds of the affirmative answers from the grammar schools and one-half of those from the high schools can be considered as representing usual help in home study. The difference between the 54 per cent of answers that help was received by grammar-school students and the 24 per cent of answers that help was received by the high-school students indicates, not only that the former students needed more help, but also that they had lessons on which help could more easily be given by members of the family. The kind of help given was sometimes alluded to, for instance, as "hearing lessons"; but the kind can better be judged by the nature of the subjects on which the help was received.

A very interesting insight into family life is offered by the answers as to the one or more persons helping in home study and

by the different proportionate representation of members of the family in the grammar- and high-school percentages as the subjects of study become more advanced. In the grammar schools the number of times the mother was mentioned was 37 per cent of the total, father 29, sister 15, brother 10, others 9; in the high schools, mother 26, father 26, sister 19, brother 11, others 18. Help in home study is unwise in most cases, mainly because it may interfere with the moral value of independent work by the student, may lessen the teacher's sense of responsibility in relation to the home preparation of lessons, and may cause a confusion of methods and understanding on the part of the student. But, on the other hand, it may develop the family knowledge of, and interest in, the student's school work, when a more companionable participation in all phases of his or her life may be limited.

The order of emphasis as to the subjects on which help is received is strikingly similar in grammar and high schools, the substitution of Latin for spelling being the only group difference. In the grammar schools the number of times mathematics is mentioned is 55 per cent of the total, spelling 16, English 15, history 7, miscellaneous 7; in the high schools, mathematics 57, Latin 27, English 10, history 3, miscellaneous 3. The dominance of arithmetic, algebra, and geometry as the subjects on which help is given shows their importance in the eyes of school and home and also the insufficient explanation and drill on these subjects in school. The percentages of help in hearing spelling-lessons and in giving suggestions for English exercises and compositions probably represent the best forms of family assistance in home study, if not overdone.

What subjects take up most of the time of home study? This is, of course, a far different question from that of the comparative total time spent in the preparation of each subject, which total would require the addition of the school study time by subjects. (Although several of the grammar schools here included require the study of specific subjects at given school periods, this plan is not yet sufficiently extensive or thorough to affect greatly the total percentages of home study by subjects. In the high schools the subjects for study periods are left almost entirely to student choice.) A comparison between the home study time for each subject can

be made mathematically by the tedious calculation from our records of the time spent each day in the study of each subject, and then by the percentile comparison of the respective totals. For instance, in the Charlottesville grammar school 29 per cent of the total home study time during the week was devoted to mathematics, 20 to English, 15 to history (including civics), 23 to spelling, 6 to geography, 7 to hygiene. In the Radford high school 23 per cent of the total home study time during the week was devoted to mathematics, 24 to English, 19 to history, 2 to spelling, 9 to science, 19 to Latin, 4 to German. The exactness of these percentages is slightly lessened by the occasional mention of more than one subject as studied during a given time, and by the necessarily arbitrary calculation of the proportionate time for each subject mentioned. Another method of comparison is the calculation of the number of days on which each subject is recorded as studied, and then the percentile comparison of the respective totals. This method is less exact than the first because it neglects the amount of time recorded, and a subject studied on comparatively few days may have been studied a comparatively large number of minutes, or vice versa. But the results of both methods are mutually corroborative. In the Harrisonburg and the Richmond (B) grammar school, respectively, mathematics was recorded 27 and 22 per cent of the total number of days for all subjects, English 23 and 19, history 22 and 22, spelling 13 and 15, geography 11 and 19, hygiene 4 and 3. In the Harrisonburg and the Manassas high school, respectively, mathematics was recorded 23 and 36 per cent of the total number of days for all subjects, English 24 and 17, history 9 and 13, spelling 2 and 0, science 13 and 3, Latin 15 and 23, German 8 and 8, commercial 6 and 0. Local differences in the figures are probably due more to different enrolment by subjects and different methods of teaching than to the present methods of calculation. The following average percentages are suggestive, as any plan of modifying home study conditions is partly dependent upon the subjects most involved: in the 3 grammar schools—mathematics 26, English 21, history 20, spelling 17, geography 12, hygiene 4; in the 3 high schools—mathematics 27, English 22, history 14, spelling 21, science 8, Latin 19, German 7, commercial 2. No general conclusion

can yet be reached as to the proper representation of subjects in home study, because the problem is fundamentally dependent for solution upon an elaborate and comparative analysis of the kind of study required by each subject for different stages, methods, etc.

Grammar school records (1,005) from Alexandria County, Clifton Forge, Newport News, Radford, and Roanoke, and high-school records (567) from Hampton, Lynchburg, and Radford, minus the few without age record, were used for a comparison of the amounts of home study by students of different ages in the same grammar-grade or high-school class. The results show no uniform tendency according to age among either the boys, the girls, or the totals. As the age at previous birthday was given on the records, each of the following age calculations is probably 4 to 6 months too young; but the significance of the comparisons will not be lessened thereby. The following figures for each grammar-grade and high-school class give (1) the average age (in parentheses) of the grade or class and (2) the respective averages of home study for the grade or class and also for each age (in parentheses) in that grade or class, if the age is represented by more than 20 records: fifth grade (11.68) 412—(10) 322, (11) 410, (12) 493, (13) 374; sixth grade (12.80) 445—(11) 432, (12) 445, (13) 444, (14) 424; seventh grade (13.94) 438—(12) 358, (13) 420, (14) 455, (15) 460, (16) 480; first year (15.02) 495—(13) 460, (14) 477, (15) 492, (16) 515; second year (15.86) 503—(15) 443, (16) 492, (17) 673; third year (16.57) 543—(16) 527, (17) 516; fourth year (17.29) 569—(17) 654, (18) 496. Of the 17 comparisons here possible 13 show an increase and 4 a decrease as age advances, but there are too many other influences involved to allow us to draw any general conclusion as to the influence of age upon the amount of home study for the same school requirements.

THE NEW PHYSICS[1]

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I am to have the honor of speaking to you this afternoon upon the new physics, and I foresee that sometime during the hour I shall inevitably make a disagreeable impression by letting out the fact of my extreme appreciation of the values of my own subject. In order, therefore, that I may have some time before the end of the hour in which to regain your good will, I shall begin with two bold assertions. The first is that a considerable proportion of the distinctive elements in modern civilization are the direct consequence of the development of the science of physics, and the second is that the world's future progress and, in particular, its ability to get out and keep out of such deplorable situations as that in which it now finds itself, may depend in no small degree upon its ability to learn two lessons which physics has to teach. These are, first, the objective, dispassionate, rational method, and secondly, faith in man's ability to subjugate, control, and improve on nature, including human nature.

My attempt will be, first, to make as clear as I may what is the method and what is the underlying philosophy of physics—a method and a philosophy which, if not altogether new in the world's history, are new in the extent of their influence and the generality of their acceptance; secondly, to show what quite recent results have followed in physics from the pursuit of this method and the holding of this philosophy; and thirdly, to indicate quite briefly some results which might follow from the more general extension of this method to other departments of human life.

First, as to the philosophy. What is the fundamental assumption which every physicist takes as his working hypothesis in his own subject and which he usually carries over to all the other

[1] A lecture delivered at Richmond College on the Walker Foundation, April 19, 1915.

departments of his thinking? All primitive people have had a philosophy which has been both animistic and fatalistic. Every phenomenon which is unusual, or for any reason not immediately intelligible, was originally attributed to the direct action of some invisible personal being. Witness the peopling of the woods and streams with spirits by the Greeks, the miracles and possession by demons of the Jews, the witchcraft manias of our own Puritan fathers but two hundred years ago. That fatalism results from such beliefs would seem to be inevitable, and it has been so in fact; for with such a philosophy, whatever happens is the will of the gods, or at least the will of more powerful spirits than ourselves, and so in all the ancient world, and in much of the modern also, in one form or another, three blind Fates sit down in their dark and dank inferno and weave out the fates of men. Man is but a speck, an atom, caught and whirled hither and thither in the play of mysterious, titanic, uncontrollable forces.

Now the fundamental philosophy of physics—a philosophy held at first timidly, always tentatively, and always modestly—held indeed always as a mere working hypothesis, but held with ever-increasing conviction from Galileo's time, when the experimental method may be said to have had its beginning, down to the year 1915—is the direct antithesis of the primitive philosophy. It holds that the world is ultimately rationally intelligible, however far from a complete comprehension of it we may now be or indeed may ever come to be. It believes in the absolute uniformity of nature. It views the world as a mechanism, every part and every movement of which fits in some definite, invariable way into the other parts and the other movements, and it sets itself the inspiring task of studying each and every phenomenon in the confident hope that the connections between it and other phenomena can ultimately be found. It will have naught of caprice in nature. It looks askance at mysticism in all its forms, whether put forth by the votaries of Dionysus in Greece in 300 B.C. or by the devotees of Bergson in Paris in 1915.

I do not wish to claim, however, that this point of view is altogether peculiar to physics. It is often called the scientific point of view. But physics as a science is very much older and better devel-

oped than the other sciences, and it was through physics that this attitude went over and into the younger sciences. Indeed, there is a rather vague and ill-defined term in use today among some biologists, namely, the term "vitalism," which represents a tendency toward a repudiation of this fundamental mechanistic hypothesis of the physicist. Nevertheless, the retiring president of the American Association for the Advancement of Science, in his recent presidential address, stated that the mechanistic hypothesis, whether right or wrong, is and must be the working hypothesis of all science, biological as well as physical. It is the hypothesis which has been responsible for all that science has done so far, and without it science is impotent for further achievements. So much for the physicist's working hypothesis. And I would call especial attention to the fact that it is in no sense a materialistic philosophy; for mind and soul and good and bad are here and hence are inside, not outside, the matchless mechanism.

Second, as to the physicist's method. It is a method practically wholly unknown to the ancient world, which was essentially subjective in all its thinking, which built up its views of things largely through introspection. The physicist's method is the method of the working hypothesis, of suspended judgment, the method which rigidly excludes all prejudices, all preconceptions, all natural or traditional sympathies, and sets itself religiously to the task of studying critically, minutely, but wholly dispassionately and objectively, the particular situation of which it is desired to find the causes and the relations. A physicist who fails to be completely objective in his study of a physical situation, who allows the minutest trace of intellectual dishonesty or preconception or prejudice to influence his study of a physical problem, is violating the most sacred duty of his profession. The physicist believes too that it is in the extension of this objective method of approach to all the problems of life that the progress and even the salvation of the world is to be found. Alas, this present cataclysm, which seems in so many ways to have set civilization back a thousand years, has furnished the pitiful spectacle of an utter disregard of the objective method by some of the world's greatest scholars—and even, we say it with infinite shame and humiliation, by some of the world's best-

known and heretofore most respected scientists. I suppose that the utterances which have come from great scholars during the past six months will be quoted in psychologies for a thousand years to come as illustrations of the temporary reversion under stress of supposedly great minds to essential savagery, where impulse alone governs action and reason is laid aside.

But despite such deplorable reversions the physicist still has faith both in his working hypothesis and in his method. Why? And here I come to the heart of my subject. Simply because, in the familiar phrase of pragmatism, it has thus far been found to work; just now it is working; and its promise of keeping on working is more brilliant than it has ever been at any preceding time in the world's history. Do you realize that, within the memories of men now living, or, say, within the past hundred years—merely a drop in the bucket of recorded time—the external conditions under which man lives his life here on earth have been more completely revolutionized than during all the ages which preceded? And it is these changes in external conditions which have been largely responsible for the changes which have occurred in his way of thinking and feeling and acting. Your own great-grandfathers lived in most respects the same kind of a life which the earliest Egyptian of whom we have any knowledge lived. He traveled so far and only so far as his own two legs or the legs of his horse carried him. He dug his ditch, he mowed his hay, he performed all the operations of his industrial life just as his Assyrian prototype had done six thousand years before, by the power of his two arms, or the power of his wife's two arms, with an occasional lift from his horse or his ox. He held the same superstitious beliefs about disease. He carried a dried potato in his pocket to keep off rheumatism. He propitiated an angry deity in almost the same superstitious way.

Not until the nineteenth century did the great discovery of the ages begin to be borne in upon the consciousness of mankind through the results of the labors of a relatively small group of patient, indefatigable men who had finally caught the spirit which Galileo perhaps first notably embodied, and passed on to Newton, and to Franklin, and to Faraday, and to Maxwell, and to the other

great architects of this new scientific world in which we live—the discovery that man can learn to understand and to control nature—the discovery that the key to the external world as well as the key to his own internal destiny lies in man's own hands. Perhaps you may prefer to have me call this not a discovery but merely a point of view, a faith. Very well, it is the faith of the scientist and, he will tell you, a faith which has been justified by works. Let me illustrate by the history of but one line of scientific study and progress.

In the mystical, fatalistic ages which preceded, electricity was simply an agent of inscrutable Providence. It was Elijah's fire from heaven which consumed the enemies of Jehovah. It was Jove's thunderbolt hurled by an angry God, and it was as presumptuous to study this direct manifestation of God's power in the world as it was for a child to investigate the strap with which it was being punished, or the mental attributes of the father who was behind the strap; and it was only one hundred and fifty years ago that Franklin sent up his kite and found these awful thunderbolts identical with the harmless sparks which he could draw on a winter's night from his cat's back. Then thirty years later Volta found that he could make these sparks in a new way, namely, by the action of common chemicals on dissimilar metals. In other words, he invented the common house battery which set the erstwhile blustering thunderbolts the inglorious task of ringing housebells for the service primarily of womankind—but note that what Jove lost in dignity and power and responsibility through this event man gained. Then thirty years later, in 1820, Oerstead found that these same thunderbolts, when tamed and running noiselessly along a wire, exert a pull upon a magnet near the wire and in that discovery the electric motor was born. And ten years later Faraday found that he did not need chemicals to produce a current, but simply to move a wire across the poles of a magnet was enough, and the dynamo was a realized fact. This was in 1831. Modern electric civilization with all its developments of electric traction, electric lighting, electric toasting, electric foot-warming, electric milking, with its long-distance transmission of power from waterfalls, with its telephony, its telegraphy, and its wireless—all this

has been the direct and inevitable result of the working hypothesis of a few physicists—Franklin, Volta, Faraday—that the most mysterious, most capricious, most terrible of natural phenomena was capable of rational explanation and ultimately amenable to human control.

In these few pages I have sketched a good part of the history of the physics of the nineteenth century. Add a page to cover the harnessing of steam, with the resultant development of the principle of conservation of energy and its applications, and you have before you an epitome of the great work of physics in the nineteenth century—a work which not only transformed utterly the external condition of man's life on earth, but transformed also his thinking. For modern philosophy differs from ancient philosophy chiefly, at least, because of the new basis for thinking which physics has given to it.

After this tremendous development of a civilization of steam and electricity which characterized the nineteenth century there were physicists who gave expression to the view that our mine had been worked out, that the great discoveries in physics had all been made. Then quite suddenly, beginning in 1896, the method and the philosophy of physics achieved new triumphs and the new physics was ushered in. The big problems of the nineteenth century had been the problems of learning how to control and apply to our own ends the great forces of steam and electricity. The new physics is giving us an insight, heretofore undreamed of, into the ultimate nature of both matter and electricity, and as a result of this insight developments are now appearing with a rapidity unparalleled even in the nineteenth century. I shall characterize this new physics as the physics of atomism, and I shall endeavor to give you:

First, a look into the new world of atoms and molecules as the physicist sees it today.

Secondly, a passing glance at the electron, the recently discovered atom of electricity.

Thirdly, an X-ray picture of radiation.

The conception of a world made up of atoms which are in incessant motion is not new. It was developed almost as clearly in the

minds of the Greek philosophers of the School of Democritus as in the mind of the modern physicist; but the idea had its roots in one case in a mere speculative philosophy, in the other case it rests upon direct, unimpeachable ocular evidence. Not that the human eye has ever seen or indeed can ever see an individual atom or molecule—this is forever impossible, and for the simple reason that the limitations upon our ability to see small objects are imposed, not by the imperfections in our instruments, but by the nature of the light-waves to which the eye is sensitive. If we are to see molecules themselves our biological friends must develop for us wholly new types of eyes—eyes which are sensitive to waves one thousand times shorter than those to which our present optic nerves can respond. But, after all, the evidence of our eyes is about the least reliable kind of evidence which we have. We are continually seeing the things which do not exist, even though our habits are unimpeachable. It is the relations which are seen by the mind's eye to be the logical consequences of exact measurement which are for the most part dependable, and these relations, in so far as atoms and molecules are concerned, have all been brought to light quite recently. The particular one of these which I want to show you this afternoon and which has been largely responsible for the silencing of all the erstwhile critics of the atomic and kinetic hypotheses is only about six years old in its quantitative aspects. But even in its qualitative aspects it is so beautiful and so convincing that anyone who has once seen it can never doubt thereafter that this world of ours is in fact in all its parts in restless, ceaseless, seething motion. Let me first give you a picture of what the physicist believes to be true about the air in this apparently quiet room. There are in each cubic centimeter of this air 27 billion billion molecules and they are all incessantly darting hither and thither like gnats in a swarm, only with the stupendous speed of a mile a second (in the case of hydrogen), ricochetting eternally against one another and the walls of the room and producing by this bombardment all the familiar phenomena of pneumatic tires and gaseous bodies generally. If you could magnify the air in the room just a thousand million times—that is, enough to make a good-sized marrowfat pea swell to the size of the earth—you would

see objects about as big as a football and if the motions would stop long enough to enable you to get a snapshot of the whole situation you would see on the average one of these objects in a cubical space ten feet on a side. Then if you let them go again you would see each of these footballs shoot on the average through thirty such imaginary cubical rooms before it banged into another football. This distance we call the "mean free path" of a gas molecule, but remember that it has been magnified a thousand million times.

Now if all this is true, what must happen to small particles which are suspended in this air? They must themselves be undergoing this fierce bombardment all the time and hence must share in the motion. Now this is precisely what I shall show you here in this experiment on the Brownian movements—what they are actually doing; and anyone who has once looked upon this perpetual and violent dance of minute suspended particles, which is only an image of what the molecules themselves must be doing only with much greater violence, cannot but wonder whether what we call dead matter has not in it after all the potentialities of life. It looks as if it were much more alive than many of our pupils often do.

But this is only one of the ways in which matter has been recently found to be more alive than we had formerly supposed. Not only are all kinds of atoms perpetually in motion but a few of the heaviest atoms, like uranium and thorium, have recently been found to be continually exploding and shooting off portions of themselves, which are actually found to be helium atoms, with speeds undreamed of in connection with projectiles of any kind twenty years ago—speeds of 20,000 miles a second, which is 50,000 times as fast as the muzzle velocity of the most powerful of modern ordnance. These shots simply disintegrate the tissues of the body when they pass through it. This is what a radium burn means. The physicist has lately actually photographed the tracks of these so-called alpha particles as they shoot through air. When these particles impinge upon a zinc sulphide screen they cause a flash which can be easily seen in the dark.

These facts of radioactivity have taught us two wholly new things about matter. The first is that the atoms of the so-called

elements are not all eternal, unchangeable things, but that some of them are slowly, but surely, transmitting themselves spontaneously into other elements. Here again we have evidence that dead matter is really very much alive in a new and undreamed of way. The second remarkable fact which the phenomena of radioactivity has revealed is that a particle of helium endowed with this huge speed can shoot straight through thousands and millions of molecules of air; that it can even go straight through a thin glass wall without leaving any hole behind, thus showing that an atom itself is a very loose structure; that it must be something like a miniature solar system with a very minute central nucleus and with very minute constituent bodies grouped about it and corresponding somewhat to the planets of a stellar system.

This brings me to my second recent triumph of modern atomism. The thing which we have called electricity and which we learned in the last century how to control and how to make do our work for us has recently been revealing to us something of its nature. In the first place it has shown itself to be something not wholly distinct from matter but so intimately associated with all matter that we are now wondering whether we shall not have to make electricity itself the primordial element out of which matter is built up. Indeed, we can now say that we know that every neutral atom of nitrogen or oxygen in this room contains, even if we cannot yet say consists wholly of, equal amounts of positive and negative electricity. We know further that we can detach from such an atom only one definite, invariable amount of electricity or a very simple and exact multiple of this amount. This amount we call an electron, and we have recently proved that all electrical charges consist simply of swarms of these minute specks of electricity, and that electrical currents consist of the transfer of these electrons through our lamp filaments or along our trolley wires. We have been able to isolate and to measure exactly one single electron and to find that in this, say, about 3 billion billion of them course per second through an ordinary lamp filament. We have found that when X-rays pass through a gas they detach negative electrons from some of the atoms of the gas, leaving the residues positively charged. Ultra-violet light does the same thing and so do the

projectiles shot out by radium. We have found that in this way electrically charged molecules are continually being formed from the neutral molecules of the air, not in great numbers it is true, for only from 3 to 20 of the 27 billion billion molecules per cubic centimeter of ordinary air becomes thus ionized per second. It is the presence of these atmospheric ions which causes all the phenomena of atmospheric electricity which have been the object of man's awe and worship in all ages. We have found that radioactive substances, in addition to ejecting continually the alpha particles, or atoms of helium, of which I spoke above, are also continually ejecting these minute negative electrons, which weigh only 1/2,000 as much as a hydrogen atom, and ejecting them with speeds which approach closely to the velocity of light, 180,000 miles per second. We have found that such negative electrons are emitted with very little velocities whenever we heat a wire white hot. These and a score of other interesting properties of electrons have all come to light within the past fifteen years. Indeed, twenty-five years ago no one had ever heard of an electron, its existence had scarcely been suspected, and the name itself had never been spoken. Today it is one of the best-known and certainly one of the most important entities in the universe. This well illustrates the stupendous advances which have been made within the past quarter-century. Up to within six years there were not a few distinguished scientists who withheld their allegiance even from the atomic and kinetic theories of matter. The most illustrious of them was Professor Wilhelm Ostwald, but in the preface to a new edition of his *Outlines of Chemistry* he now says frankly:

> I am convinced that we have recently become possessed of experimental evidence of the discrete or grained nature of matter for which the atomic hypothesis sought in vain *for hundreds and thousands of years*. The isolation and counting of gaseous ions on the one hand . . . . and on the other the agreement of the Brownian movements with the kinetic hypothesis . . . . justify the most cautious scientist in now speaking of the experimental proof of the atomic theory of matter. The atomic hypothesis is thus raised to the position of a scientifically well-founded theory.

Nor have these remarkable discoveries, which have recently followed one another so rapidly across the stage of physics that the actors themselves have scarcely known what was happening, been

without immediate utility to man. The last fifteen years have been a period in which the commercial and industrial world has been adopting and adapting to its own uses, with a rapidity hitherto altogether unparalleled, the latest products of the laboratory of the physicist and the chemist, so that the results of yesterday's researches designed for no other purpose than to add a little more to our knowledge of the ultimate structure of matter are today seized upon by the practical business world and made to multiply tenfold the effectiveness of the telephone or to extract six times as much light as was formerly obtained from a given amount of electric power.

It is then not merely a matter of academic interest that the atomic and kinetic theories of matter have been proved correct, that the electricity has been found to be atomic or granular in structure, that the elementary electrical charge has been isolated and accurately measured, and that it is found to enter as a constituent into the making of all the seventy-odd atoms of chemistry. These are indeed matters of fundamental and absorbing interest to the man who is seeking to unveil nature's secrets, but they are also events which are pregnant with meaning for the man of commerce and for the worker in the factory. For it usually happens that when nature's inner workings have been laid bare, man sooner or later finds a way to put his brain inside the machine and drive it where he wills. Every increase in man's knowledge of the way in which nature works must and does in the long run increase by just so much man's ability to control nature and to turn her hidden forces to his own account.

Now comes the third recent advance of extraordinary interest and importance. X-rays were discovered in 1896 and it was their discovery which was the starting-point of all these new developments. But what are these mysterious rays which enable one now to see all through himself, to watch his own heart beat, to see his stomach digest its food, to locate every foreign substance which gets into the body? For about sixteen years we worked with X-rays and learned much about them, but we didn't know what they were. Within the past two years, however, they have given up their secret. They are waves apparently just like light-waves

except that their wave-length is 1,000 times shorter. When an electric spark passes between the knobs of an electrical machine, a series of periodic disturbances start off through space, carried, we have supposed, by some medium, the ether, much as sound-waves are carried by the air. These waves are the waves used in wireless telegraphy. Their vibration rate or pitch is about a million a second. When an electrically charged molecule oscillates about its position of equilibrium in a solid body exactly similar waves radiate out through space, except that their wave-length is much shorter, that is, their pitch is higher, say a million times higher. The vibration rates would then be a million million. These are the invisible heat-waves. When the electrons oscillate within the atom, waves of still shorter wave-length and higher pitch travel out from the vibrating electron. These are the light-waves, which, when they fall upon the optic nerves, endow us with all the blessings of vision. Their vibration rate is from 100 to 1,000 times higher still. When high-speed electrons plunge through matter, they set into vibration some kind of unknown subatomic oscillators, probably electrons held by powerful forces in the very nucleus of the atom, whose vibrations cause X-rays to travel out through space. Their vibration rate is 1,000 times higher still, about a billion billion per second. So much we feel fairly confident about.

But what is happening in the empty space through which these waves are traveling? This is the most interesting of the unsolved problems of physics. The ultimate nature of these ether-waves is still a complete mystery, but even here we are beginning to get evidence that we have something to deal with which is unitary or atomic. When ether-waves of high enough pitch, light-waves or X-rays fall on the atoms of matter, they are found to have the property of ejecting electrons from them with a speed, or rather with a kinetic energy, which seems to be determined solely by the pitch or frequency of the incident light, and this energy seems to be coming out directly proportional to this frequency. In other words, we are beginning to discern in this factor of proportionality between the energy of ejection of the electron and the frequency of the light or X-ray which ejects it a universal constant characteristic of all so-called ethereal or electromagnetic radiation. In

this sense the spirit of atomism has invaded the domain of ether physics also.

But here I have brought you up to the outmost boundaries of our knowledge. Call me back in ten years and I will tell you a great deal more. All these matchless results of modern physics have been worked out by the joint and friendly labors of the English scientist, the French scientist, the German scientist, the Russian, the Italian, and the American scientist. Never had the world been striding forward at so marvelous, so inspiring a pace, and then came the 1st of August, 1914, and a wild, insensate madness came upon it and in one day it had plunged back a thousand years toward barbarism. It seized its choicest young men, its finest scientific brains, and began sacrificing them by the thousand on the fiery altar of Moloch—and to what purpose? None save the lust of power, the desire to rule, the gratification of an insane spirit of nationalism. And all about you now you hear men trying to condone this welter of blood and prejudice and hate and falsehood, this most ghastly crime in history, this most hellish hell which man ever made on earth, with that barbarous, outworn, utterly discredited philosophy of mysticism and fatalism that war is God's way in the world, or that war is nature's law, whichever way you wish to put it. Were it not for the history of science during the last fifty years we might indeed, at times like this, wonder if we were not simply whirled along by a huge world of forces over which we have no control. But with that history the scientist becomes an optimist. The divine plan has placed in man's own hand the working out of this world's destiny. If he plunges it into war and hell it is man's own fault. Modern science has burned the decrees of fate, it has put the three old women out of business, it has placed instead the hand of man upon the throttle of this speeding world.

On every hand the scientist has made nature over and has vastly improved upon her. If he hasn't a fruit of the right taste or size he makes one. If he hasn't an ox of the right qualities to stand the Texas storms and yet to make good beef, he makes a new one which has got the toughness of the bison and the beefiness of the Durham. If the soil doesn't produce enough he learns how to make it produce

more, and, most important of all, he is slowly learning to control his own natural appetites and to replace the law of tooth and claw, the old law of survival of the fit, by one of *intelligent predetermination*. When we first see him in the dawn of history he was quite unconscious of himself and of his own power and of the part he was destined to play in the evolutionary scheme, and the changes which he wrought in the external conditions under which he lived were correspondingly few and far between. But gradually through the growth of science he has become conscious of himself and has brought about the changes with astonishing rapidity, so that today he is the chief factor in evolution. The lesson which physics has to teach the world is that war can and must be abolished; and it will be abolished through the adoption by the nations of the earth of the method and the faith of the scientist—the method of calm, judicial, tempered, reasoned action; the faith in man's own ability to cure his own ills, social as well as physical; even the faith that he can find a way to stay the ravages of the most hideous, most loathsome disease which has thus far blighted the lives of men, the disease of militarism, just as he has already found a way to stay the ravages of diphtheria and smallpox.

TENDENCIES IN SECONDARY EDUCATION IN THE MIDDLE WEST

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Secondary education in the Middle West, as elsewhere, has assumed an unusual degree of importance within recent years. Within the last decade the increase in enrolment in the North Central and Western territory has been 79 per cent, as compared with an increase of 74 per cent in the North Atlantic states.[1]

A slightly larger proportion of the *total population* is enrolled in schools in the North Central and Western territory than is enrolled in the North Atlantic states. The figures for the North Central states are 19.3 per cent, for the Western states 17.4 per cent, and for the North Atlantic states 16.31.

Not only is there a larger percentage of the total population enrolled in school, but a larger percentage of the *school population* is in attendance. The figures for the North Central states are 76.17 per cent, for the Western states 81.09 per cent, and for the North Atlantic states 68.50 per cent.

The question arises whether or not a larger proportion of the students are in *secondary* schools in one part of the country than in others. In answer to this it may be said that 8 per cent of the total school enrolment is in the high school in the North Central territory, 10 per cent in the Western territory, and 8 per cent in the North Atlantic territory.

In general it may be said that there are but slight differences in the degree of growth in secondary education in the North Atlantic states, the North Central states, and the Western states. Such slight differences as may be found are almost uniformly to the advantage of the North Central or Western states. However, the same forces that have been operative in the expansion of

[1] These figures are taken from the *C.R.*, 1913, Vol. II.

secondary education in one section of the country have apparently been operative in other sections of the country. The significant thing that comes out of such an analysis is the striking similarity in all phases of growth throughout the different sections of the country.

PRIVATE SCHOOLS

Private schools are better supported in the North Atlantic and Western territory than in the North Central territory, as is shown from the fact that 17 per cent of the secondary-school enrolment in the North Atlantic states is to be found in private schools, 17 per cent in the Western states, while only 11 per cent is to be found in the private schools in the North Central states.

SEX DISTRIBUTION

The percentage of male teachers in the high schools of these three sections is almost the same. The percentage of male teachers for the high schools of the North Atlantic states is 43 per cent, for the North Central states 45 per cent, and for the Western states 43 per cent. Evidently the same forces are at work in the different sections of the country in so far as the selection of sex of the teachers is concerned.

A striking similarity is found also in connection with the sex of the students in the secondary schools. In the North Atlantic territory 47 per cent of the students are boys; in the North Central territory 44 per cent; in the Western territory 45 per cent. Evidently the same forces which are operative to attract boys in the high schools of one section are operative in the other sections.

ACADEMIC WORK IN HIGH SCHOOL

In the North Atlantic states 69 per cent of the students are classified under the head of academic work, in the North Central territory 79 per cent, and in the Western territory 75 per cent. In the North Atlantic states 19 per cent of the students are reported in commercial courses, in the North Central territory 13 per cent, and in the Western territory 10 per cent.

From these figures it may be inferred that the students in the West are less interested in the commercial courses than are the

students in the East. This is, in all probability, a natural situation, in view of the differences in the density of population, with the attendant differences in vocations.

SIZE OF THE HIGH SCHOOL

The widespread disposition in the West to afford high-school advantages within easy access of the students, coupled with the comparative sparseness of population has resulted in the organization and development of many small high schools. For example, in Iowa 60 per cent of the high schools have fewer than 100 students. This is fairly true of other states in the North Central territory. As a consequence of the small enrolment, there is a small teaching body. The modal number of teachers in the Iowa high school is three. The fact that there are few teachers means that each teacher is required to teach more than one subject. In fact, it is not an uncommon thing to find a teacher teaching four or five different subjects, such as botany, algebra, English, physics, and agriculture. Indeed, every study which has been made of this situation in the small high school indicates a lamentable situation in regard to the qualifications of the teachers to teach the subjects required. Mr. Josselyn, of the University of Kansas, who recently analyzed the teaching combinations of the teachers in Kansas, found that only about one-quarter of the teachers were teaching one subject, while another quarter were teaching three subjects, with hundreds teaching from four to five subjects. A similar study in Iowa revealed the same situation. Interest attaches to the question of the qualifications of the teacher to teach four or five subjects. Suffice it to say that for the present the typical college graduate is not qualified to teach the range of subject-matter required to be taught.

COURSES OF STUDY

From the nature of the case the typical small high school offers very little in the way of election. While it is true that many high schools attempt to introduce a degree of flexibility in the course by means of alternating courses from year to year, yet in the main students who enter these schools must take a set course.

Owing to the fact that the characteristic high school of this territory either is on the accredited or approved list of a state

university, or is aspiring to be, it may be seen readily that where only a single course is offered this course is of such a nature as to meet the requirements of the higher institutions. Thus the modifications in the course of study of the small high school parallel the changes in the entrance requirements of the colleges in the states in which the high school is located. A study of the course of study reveals evidence of the influence of the Committee of Ten, the Committee on College-Entrance Requirements, and the Committee of Nine, which latter committee is only beginning to wield an appreciable influence in these schools.

With the growing disposition to question the traditional course of study has come about legislation in a number of states favoring the introduction of the newer subject-matter. This has come about in the form of subsidy for special work as is found in Minnesota, or coercion as is found in Iowa. For example, in Minnesota a community which introduces certain of the newer subjects in its high school is entitled to receive a specific money grant from the state. In Iowa beginning with this year all schools in the state are required to teach agriculture, home economics, and manual training.

The fact that the high school with a small teaching force can teach only a limited number of subjects contributes to the uneasiness and dissatisfaction in regard to the course of study in the high school and the college-entrance requirements. It should be said in this connection, however, that changes are going on constantly. New subjects are being introduced in the schools, and the colleges are changing their entrance requirements. Each change is made in the direction of a greater degree of flexibility. It should be noted, however, that the small high school is limited to a single course of study from the very fact that its corps of teachers is limited.

NORMAL TRAINING COURSES

Normal training courses are quite general throughout the high schools of the North Central states. For example, special subsidies are offered by the states for the development of normal training courses in Minnesota, Iowa, Nebraska, Kansas, and other states.

THE NORTH CENTRAL HIGH SCHOOLS

Almost a thousand of the leading high schools in the North Central territory have met the standards prescribed by the North Central Association of Colleges and Secondary Schools. Credits made in these high schools are accepted for entrance throughout this territory. This organization, which has developed during the past two decades, has had a powerful influence on the standards of secondary education. An attempt has been made to fix requirements for the qualifications of teachers, the amount and kind of apparatus, libraries, and laboratory equipment, length of term, and other external conditions. The subject-matter taught has been prescribed somewhat definitely by committees appointed by this organization. As new subjects have appeared they have sought to prescribe and limit units of work in the various fields, such as agriculture, manual training, and the like.

Practically all of the high schools in the towns of 2,500 or more in the North Central territory either are or have been on the approved list of this association, so that a study of these high schools is of significance in any attempt to understand secondary education in this territory.

Even here it is a noteworthy fact that the high schools are small. For example, the median of this list in North Dakota has 112 students, in Nebraska 137 students, in Illinois 143 students, and so on up to a median enrolment of 244 students in Indiana.

The towns in which these high schools are located vary from a median population of 3,430 in North Dakota to 9,250 in Illinois. Wide variability exists in the size of the high school in towns of the same population. For example, in towns of from 7,500 to 10,000 population the size of the high schools varies from less than 100 to more than 1,000. However, in the main the median high-school enrolment in this territory varies with the size of town. The range of medians is from 109 in towns of 2,500 or less to 841 in towns of 50,000 or more.

The median number of teachers in these high schools varies from five in Nebraska to ten in Indiana. There is a somewhat wide variation in the provisions made by the different states for teaching. For example, the median six-teacher high school in Minnesota

and North Dakota has 75 students, while the median six-teacher high school in Ohio has 175 students. The median eight-teacher high school in Minnesota has 110 students; in Indiana, 250 students. Table I shows the wide variation in regard to the average number of students per teacher. This table becomes clear

TABLE I

Total No. Students per Teacher	Under 2,500	2,501–5,000	5,001–7,500	7,501–10,000	10,001–15,000	15,001–50,000	Over 50,000
5	1	5	2	.....	1	.....	.....
10	15	14	5	1	2	2	7
15	15	23	21	10	8	11	3
20	24	51	37	20	23	34	9
25	16	44	30	20	23	30	28
30	2	20	9	12	8	16	12
35	.....	3	5	5	1	3	1
50	1	.....	.....	.....	.....	2	1
No. cases	74	160	109	68	66	98	61
Median	20	20	20	20	20	20	25

when read thus: Of the 74 cities with a population of 2,500 or less, one city employs a high-school teacher for every 5 pupils; 15 employ one teacher for every 10 pupils; and so on.

It is noteworthy that no clear correlation exists between the average number of students per teacher and the size of city; small cities adhere quite as closely to the central tendency in this particular as do the larger cities until the population reaches 50,000. That is, the employment of one teacher for every 10 pupils is found in cities of every class. The median number of pupils per teacher, however, for each class is identical in all cities with a population of less than 50,000.

In the face of such differences there can be little doubt that the pressure of outside standardizing agencies falls with unequal intensity on the different schools.

ORGANIZATION

The teachers in these schools are forbidden to teach more than six recitations per day, and school authorities are encouraged to limit the number to five. In the smaller high schools of this territory (not on the North Central list) the teachers teach six to seven recitations per day. The standard length of recitation

period is 40 minutes or more; 40 and 45 minutes are the most frequent periods.

SEX OF TEACHERS

Interest is attached to the question of the sex of the principals and teachers. Table II gives the data concerning principals.

TABLE II

Population of Cities	Under 2,500	2,501–5,000	5,001–7,500	7,501–10,000	10,001–15,000	15,001–50,000	Over 50,000
Percentage of women principals.....	43	31	16	16	12	5	3

This table should be read thus: In the cities of 2,500 or under, 43 per cent of the principals are women, etc. It should be noted that the number of women principals steadily falls off as the size of the school increases.

The sex of the high-school teacher is likewise of interest. Table III gives the data concerning teachers. This table should be

TABLE III

Population of Cities	Under 2,500	2,501–5,000	5,001–7,500	7,501–10,000	10,001–15,000	15,001–50,000	Over 50,000
Percentage of women teachers	80	70	71	66	65	62	63

read thus: In cities of 2,500 or less, 80 per cent of the teachers are women, etc.

It is of interest to note in this connection that the percentage of women as teachers or principals is greater in the small city than in the large.

SALARIES

The salaries of the principals in these high schools vary widely. For example, in towns of 7,500 to 10,000 population the variation in salary paid to the principal is from $650 to $3,000. The median salary varies from $850 in cities of 2,500 or less to $3,000 in cities of 50,000 or more. The maximum salary of high-school teachers likewise varies greatly. In cities with a population of from 7,500 to 10,000 the maximum salary of teachers ranges from as low as $600 to as high as $1,700. The median maximum salary varies from $750

in towns of 2,500 population or less, to $1,600 in towns of 50,000 of more.

EXPERIENCE

The experience of the teachers in these high schools represents a wide range of variability. For example, in towns of 7,500 to 10,000 population there are 170 teachers with no experience, and

TABLE IV

Rank	ubject	No.	Per-cent-age	Rank	Subject	No.	Per-cent-age
1..	Bookkeeping	327	75	28..	Electricity	42	10
2..	Commercial arithmetic	310	71	29..	Millinery	38	9
3..	Mechanical drawing	275	63	30..	Accounting	37	9
4..	Cooking	274	63	31..	Farm management	36	8
5..	Sewing	259	59	32..	Geometrical drawing	35	8
6..	Typewriting	258	59	33..	Commercial history	30	7
7..	Shorthand	254	58	33..	Industrial history	30	7
8..	Commercial geography	250	57	33..	Sanitation	30	7
9..	Commercial law	206	47	34..	Mechanics	26	6
10..	Cabinetmaking	205	47	35..	Foundry	21	5
11..	Wood joinery	199	45	35..	Horticulture	21	5
12..	Penmanship	176	40	36..	Dairying	20	5
13..	Turning	149	34	37..	Modeling	17	4
14..	Commercial spelling	133	30	38..	Poultry raising	16	4
15..	Commercial English	133	26	39..	History of education	15	4
16..	Pedagogy	107	24	39..	Agricultural chemistry	15	4
17..	Psychology	104	23	40..	Manual and technical	14	3
18..	General agriculture	70	21	40..	Domestic arts (general)	14	3
19..	Methods	78	18	40..	Normal training	14	3
20..	Advanced bookkeeping	77	18	41..	Printing	13	3
21..	Farm and garden crops	75	17	42..	Plant properties	12	3
21..	Pattern work	75	17	43..	Carving	10	2
22..	Carpentry	73	17	43..	Machine construction	10	2
23..	Soils	71	16	44..	Ornamental gardening	5	1
24..	Food chemistry	65	15	45..	Plumbing	3	¾
25..	Forge work	61	14	46..	Surveying	2	½
26..	Advanced shorthand	56	13	46..	Bricklaying	2	½
26..	Architectural drawing	56	13	47..	Mineralogy	1	.....
26..	Animal husbandry	56	13	47..	Assaying	1	.....
27..	Mechanical drawing	53	12				
28..	Machine-shop	42	10				

one teacher who has had 43 years of experience. The median experience of the teacher varies from 3.+ years, in towns of 2,500 or less, up to 8.+ years in towns of 50,000 or more.

EDUCATION AND TENURE

The typical teacher holds a degree of Bachelor of Arts. About one-eighth of the teachers hold Masters' degrees. Over one-third

of the teachers are serving their first year in a particular position. This means that between 30 and 40 positions out of 100 are open annually. The typical tenure of position in small towns is one year, increasing to two years in cities up to 50,000, with four years in cities whose population exceeds 50,000.

VOCATIONAL WORK

In view of the fact that this group of nearly one thousand high schools are intimately affiliated with the college or university, it is of interest to note what they are doing in connection with vocational subjects. Mr. H. W. Anderson, a graduate student in the state University of Iowa, has recently made an investigation of vocational subjects taught in these high schools. He received returns from almost five hundred of these schools. Forty-seven different subjects of a vocational nature were offered, ranging in frequency from bookkeeping and commercial arithmetic, which were taught in something like 75 per cent of the cities, to bricklaying, which was taught in one-half of 1 per cent of these schools. Table IV, taken from Mr. Anderson's report, is suggestive.

He found a wide variation in the frequency with which particular subjects appear in the high-school curriculum. This variation is apparent in every state and in cities of every size. A vocational subject may be offered by a small percentage of the schools in one state, and by a large percentage in another. He summarizes his investigation thus:

> On the whole, commercial courses seem to be best established, and agricultural and normal training subjects are offered with the least frequency.
>
> The subjects ranking highest for each group are bookkeeping in the commercial group, general agriculture in the agricultural group, mechanical drawing in the mechanic arts group, cooking in the domestic arts group, and pedagogy in the normal training group. Only eight subjects, five of them commercial, two domestic arts, and one mechanic arts, are offered by more than 50 per cent of the schools.
>
> Private schools give less emphasis to the vocational subjects.
>
> Wide variation exists in the year or grade of occurrence of the vocational subjects. Normal training subjects are mainly in the fourth year. Shorthand and typewriting and commercial law are third- and fourth-year subjects. The remaining vocational subjects are usually offered in the first and second years. Vocational courses are offered mainly for one semester or for one year. The exceptions are shorthand and typewriting, two-year courses, and mechanical

drawing, sewing, and cooking, which are given in the dual modes of one year and two years.

However, a few subjects, such as commercial geography and wood joinery, are semester subjects. It is a general tendency to devote less time to vocational subjects in private schools than in public schools. For example, shorthand, a two-year course in the public schools, is a one-year course in the private schools.

The commercial, mechanic arts, and agricultural subjects include a fairly constant percentage of the high-school enrolment, approximately from 18 to 20 per cent. The domestic arts subjects, sewing and cooking, include about 15 per cent of the high-school students. Each normal training subject includes about 6 per cent. Approximately 40 per cent of the boys are enrolled in mechanic arts and agricultural subjects. About 30 per cent of the girls are taking cooking and sewing, and about 11 per cent normal training. The number of recitations per week seems to be 5.

Vocational subjects are invariably electives.

SECONDARY SCHOOLS IMPORTANT

It should be said that the high schools in the Central West are assuming a new degree of importance. The men at the head of these schools are as a whole well-trained, alert members of the teaching profession. The schools are in the main well supported by public taxation. Magnificent buildings are being erected. Elaborate equipment is being secured. In the typical mid-western city the high school assumes a large place in the community life. The general public is interested in the doings of the high school; her athletics, her debates, her oratorical contests, her social activities, her commencements, her fortunes and misfortunes. As a result of this support, the leaders in the field of secondary education are taking new and decided stands in regard to the nature of their work. They are quite naturally somewhat intolerant of restrictive measures either by state authority, by associations, or by the colleges. It may be that they are too sensitive to pressures which are being exerted. It is to be hoped that this is not the case, because of the fact that it is necessary that secondary education be developed along with the elementary and higher phases. With the increased dependence on public education, it is imperative that the work of elementary, secondary, and higher education be sufficiently amenable to control, be sufficiently flexible, to permit of the adjustments that are necessary in the training of people of such varying abilities, tendencies, and ideals as are found in our mid-western states.

EDUCATIONAL NEWS AND EDITORIAL COMMENT

Direct Subsidies to Teachers

The School, of the University of Toronto, asks "What are the obvious objections to subsidies in cash given directly to teachers?"

First, there is the danger that school boards, in the United States at least, might keep salaries low, on the theory that teachers can supplement their salary by the direct state or federal grants.

Secondly, there is the danger, always present in high centralization, that the individual school units might assume a careless attitude toward educational progress.

Thirdly, there is the danger that teachers, even more than at present, may center their thoughts too much on income.

In spite of these objections the *School Review* is prepared to accept the statement of *The School* that in Ontario the measure of the success of direct subsidies is found in the very rapid growth in the number of teachers who are competent to give instruction in their subjects (art, agriculture, manual training, household science, etc.), and that the success of the plan is found also in the large number of schools instituting the new courses.

Money in the pocket is a powerful inducement to individual teachers and to school boards.

Peace Teaching in the Schools

The National Education Association on August 27, 1915, adopted a Declaration of Principles formulated by the committee consisting of Ellwood P. Cubberley (chairman), Robert J. Aley, Fannie Fern Andrews, Mary C. C. Bradford, J. Stanley Brown, J. H. Francis, and Carroll G. Pearse. The most prominent feature of the declaration (which is printed in *School and Society* for September 11) is a pronouncement on the European war and upon the responsibility which is believed to rest upon the school for the prevention of war. The following paragraph represents the general point of view regarding the social significance of the war and its relation to education:

On the other hand, the virtual breakdown of civilization in Europe, which has taken place since the last meeting of this Association, has revealed to us how ineffective after all have been the systems of education upon which we

have in the past placed so much dependence, so far as the imparting of that type of education which would tend to preserve and advance the higher interests of civilization is concerned. In an age marked by so great an expansion of educational activities, such great industrial and commercial progress, such wonderful discoveries and advances in the application of science, and such progress in advancing the social welfare, we see nations heretofore devoted to the arts of peace and the advancement of civilization almost at once lapse into a barbarism which a year ago we should not have believed possible. Not only have the systems of education of Europe proved disappointing at the time of supreme test, but we cannot console ourselves that the results would have been markedly different with us had this nation become engaged in such a titanic struggle.

The declaration then goes on to outline the proposed remedy for the evils of war and national antagonisms.

Our instruction, aside from those fundamental tool subjects which underlie all educational work, has been based upon too narrow an outlook. Nationalism has been pushed to the front and emphasized, rather than international justice and goodwill. . . . . Our patriotism has been concerned too much with our rights and too little with our obligations; too much with securing advantages for ourselves and too little with the extension of international justice and good will. There has been too much talk in all nations of "national honor" and "rallying to the defense of the flag" and too little of national obligations and responsibilities. . . . . The masses of the people do not want war, but peace. International hatreds are kept up by the governing classes and those who profit by such hatreds, and the basis for national jingoism and future international strife is continually implanted in the minds of the rising generation in the schools of the different nations. In most nations today the schools are deliberately used by those in authority to instil into the minds of the young an exaggerated nationalism, which can be touched off into international hatred at such moment as the governing authorites may desire.

The declaration then makes the familiar recommendation that school histories be rewritten. "The biologic, economic, and human waste of war should be emphasized, and the fact that war is the breakdown of law and order and civilized society should be made clear to the young." The declaration next (1) deplores the present war, (2) reaffirms its approval of the American School Peace League, (3) deplores any attempt to militarize this country, (4) commends international associations, (5) recommends the appointment of educational attachés to legations and embassies in foreign countries, and (6) congratulates the Panama Pacific Exposition upon its many congresses.

With the aim and with the general tenor of most of the statements and recommendations of this declaration most educators will doubtless

agree. It is worth while, however, to call attention to the fact that the subject which is here dealt with is a complex and delicate one, and that there is some danger that the body of teachers of the country, who as a whole have a very limited education and hence a limited knowledge of history and of international politics, may be swept off their feet by a wave of enthusiasm, unsteadied by any patient effort thoroughly to understand the significance of international events. It is easy to call names, and it gives us a feeling of self-righteousness to describe the war as a "lapse into barbarism" and a "breakdown of civilization," but it would seem to be a first step toward international good feeling to recognize the worthy as well as the unworthy motives which animate the peoples at war. Are we ready to describe the American Revolution and the defense of Belgium as lapses into barbarism? Is honor a wholly ignoble attitude, and could we at the present moment dispense entirely with the influence of the sense of personal and national honor? If honor may sometimes be silly, may it not often be the chief obstacle to unworthy actions?

The school is undoubtedly of great influence in molding the sentiments of the people, and may be misused to instil false ideals and standards. And yet if this is the chief source of international strife, as described in the second paragraph which was quoted above, how is it that "the results would [not] have been markedly different with us had this nation become engaged in such a titanic struggle"? Surely our schools are not thus made the tools of the "governing classes." We must recognize that the influence of the school in the establishment of sentiments depends in large measure upon the degree to which it represents the community sentiment. It is a dangerous thing for the school to become the medium of a propaganda which does not express the attitude of the people as a whole. The teaching body should be leaders so far as the people will follow, but only so far. These comments are not intended to attempt to discourage the movement toward universal peace. With the aim of this movement we may well be in entire sympathy. But it is highly desirable that we approach a problem of such complexity with great care, so as to insure in the body of teachers a well-balanced, intelligent attitude.

Military Training in Schools

The conflict between the proponents of pacifism and of military preparedness has found expression in the debate over a proposal by Adjutant-General White to "organize and train a cadet company in each of the

four Portland high schools," as reported in the Portland daily papers. The arguments were heard by a teachers' committee of the school board which was appointed to make recommendations concerning General White's proposal. The arguments on both sides were heated, as is evidenced by the following extract from the account in the *Portland Journal:*

"Boys should have military training in the public schools." [Excited applause.]

"Boys should have nothing of the kind. Train them for war, and you sow the seeds of war." [More excited applause.]

Thus those who favored training and those opposed alternately expressed their approval or disapproval as their speakers advanced opposite views before a meeting of the teachers' committee of the school board last night.

The pacificists varied their applause for their own sentiments with groans for those of the opposition.

"I Didn't Raise My Boy to Be a Soldier" was not sung, but the sentiment was repeated again and again by Portland women present to protest against the proposal to establish voluntary military training in the public schools.

Those who favored the plan were also outspoken. They were mostly men, and those who opposed the plan were mostly women.

The committee took no action, and will make no recommendations to the board until the plan is more definitely submitted.

The plan was proposed by Adjutant-General White, O. N. G.

Rev. C. E. Cline was on the side of military preparedness.

"This advocacy of peace, peace, peace is all wrong," he said. "These peace societies should be called war societies, because they want to remove every semblance of defense."

He said that the pacificists "want to raise a lot of boneless turkey boys."

He referred to "these women with soft hearts and soft heads."

Dr. Nina E. Wood, organizer of the World's Peace Association, objected to Mr. Cline's epithets and asked Dr. Alan Welch Smith, who presided, to call him to order. Dr. Smith rapped for order, but allowed Mr. Cline to continue without rebuke.

Mrs. L. W. Newton said there was a woman present who represented 5,000 Portland women, and that that woman should be heard. Mrs. Alva Lee Stephens, president of the Portland Parent-Teacher Association, was the woman referred to.

Mrs. Stephens rose and said that she "did not wish to speak because there was so much emotionalism being exhibited by the gentlemen present. I am accustomed to speaking before dignified bodies of women " she said.

However, Mrs. Stephens proceeded to say that the women "protest against militarism in the schools at this time."

"We are not for peace at any price," she said, "but we do not think it opportune at this time to put military training in the high schools.

"Probably in three years from now, when we have universal peace," Mrs. Stephens continued, "it will be advisable to consider this proposal as a matter of physical training.

"But we protest at this time," she concluded "and we have thrown down the gauntlet."

By "physical training" Mrs. Stephens referred to the claim that military drill would be good for that purpose. She said that the schools have plenty of physical training at present.

General Thomas M. Anderson, represented the G.A.R., the Loyal Legion, and the Sons of the American Revolution.

"Patriotism is the loftiest sentiment," he said, "even if it has been called the last refuge of scoundrels."

The women laughed, and the general came back at them:

"Women have been blamed for many wars. I hope they will be forgiven, for they have done all the mischief they could."

"We are going to put a military company in every high school in Portland," said A. W. Orton, chairman of the committee of organizations that favor the plan.

"If not this year," he continued, "then next year or the year after, or just as soon as we can get the school board to give it to us."

He said that "it is a question of mollycoddles on the one side and preparedness on the other."

Arthur D. Lee, chairman of the Spokane School Board, said the plan is being considered there, and that he will do all in his power to put it into effect.

"Teach children that it is right for nations to kill, and you will implant the ideas that it is right for individuals to kill," said E. J. Stack, secretary of the Central Labor Council.

"Military training in the high school is only carrying out the duty of every citizen," declared Colonel James Jackson.

Dr. Emmet Drake received a tribute of groans from the pacificists when he said that he had only contempt for any organization that sought to prevent efficiency in war.

M. L. Pratt of the G.A.R., spoke in favor of preparedness.

Mrs. G. L. Buland, of the W.C.T.U., and Mrs. Ina Coleman, of the Oregon Congress of Mothers, spoke against the plan, Mrs. Coleman saying that mothers do not want war, and do not propose to have it.

Dr. Smith and S. P. Lockwood compose the teachers' committee before whom the hearing was held.

It is clear that there is no unanimity of opinion in the minds of the public in regard to the best means to insure peace. It is safe to say that there is no considerable body of jingoists in the United States, but the

number of those who believe that military preparedness is necessary to insure honorable peace is probably at least equal to the number of those who regard all armament as prevocative of war. President Wilson, who is certainly desirous of peace, has initiated measures for the purpose of more adequate preparedness. In such a case as this it is the right and duty of teachers as individual citizens to form and make effective their opinions, but it is assuming a grave responsibility for the teaching body as a whole officially to adopt and carry out a partisan policy—for a partisan policy it must be considered which lacks so much of unanimous support by the whole body of citizens. This the National Education Association seems to have done. On the other hand, it would be in violation of the principle which has been laid down if military training were introduced into the schools without some clear evidence of the sentiment of the public. This is not primarily an educational question. It is primarily a question of state and national policy.

The High-School Textbooks in New York

New York City furnishes free textbooks to its high-school pupils. It appears from a report in the *New York Globe* that a change to the more common plan of requiring the pupils to furnish their own textbooks has been proposed, and the Board of Superintendents has recorded itself as strongly opposed to a change. The resolution is in the main a general argument for the high school, only slight discussion being given to the assumption that the cost of textbooks is a factor which is sufficient to influence high-school attendance to a material degree. Following two paragraphs on the importance of high-school education the resolution continues:

"What we need is more, not less, elementary-school children to carry into organized training of more advanced years. To make this more difficult is to leave more of the educational process lamentably incomplete. The policy of New York state by the recent establishment of free scholarships is to increase the number of young citizens receiving even college education. The establishment of free state universities throughout the country, the growing tendency of the universities to widen their scope so as to train not only the youth of literary and scholastic bent, but those not so inclined, is evidence of the popular belief that free education to the young up to the age of twenty to twenty-five years is a good public investment. To impose even slight financial obligations upon the older children in our public-school system is contrary to the trend and purpose of public education.

"That some other cities have not yet advanced to the point of free textbooks is not, in our opinion, an argument justifying the New York Board of

Education in receding from the advance made by it. That the nation supplies not only instruction and books, but housing and maintenance for its students in Annapolis and West Point, as well as for all its men in training in the regular army and navy, shows what is done under stress of that which is officially deemed a public necessity. The training of citizens for service in time of peace is theoretically a public necessity. Its extension has gone steadily forward since the establishment of free schools. To carry such service further is the duty of every school superintendent in the nation. No financial crisis should be used as an excuse to mutilate this principle. If economies in supplies and textbooks must be made, they should not conflict with the larger policy of increasing the facilities for training adolescent youth."

It is not clear to the Board of Superintendents that the question whether parents can afford to buy the books enters into the determination of the policy to be followed. The board was requested to investigate so far as possible the financial ability of pupils in the high schools to purchase their own books. "On inspection of the registration rolls of sample high schools," says the report, "we find that the parents of high-school children are in the great majority of cases of the same financial ability as the parents of children in the elementary schools. The percentage of children in the elementary schools compelled by law to attend is greater than in the high schools. The high schools, therefore, need more, not less, incentives to attract children to them and to retain them after registration. The Board of Superintendents is requested to suggest to the Committee on Supplies and to the Committee on By-laws a plan whereby the loss due to injury and non-return of high-school books may be decreased. We recommend the plan used in the Boys' High School of Brooklyn, description of which is inclosed.

"The Board of Education's Committee on Studies and Textbooks desires the Board of Superintendents to consider the desirability of decreasing the list of high-school books without the sacrifice of any educational benefits. This matter is under consideration, inquiries having been sent to various persons."

It may be that the position of the Board of Superintendents is well taken. It is to be regretted, however, that we do not have some more direct evidence of the effect on high-school attendance of furnishing free textbooks. Studies of elimination from the school have indicated that financial considerations are not now so decisive in the elementary school as we have been accustomed to suppose. The expenditure of the small amount of money necessary to procure textbooks may serve to enhance the value of the opportunity in the mind of the pupil. Philanthropic institutions sometimes find it desirable to impose a slight fee solely on this account. Furthermore, the ownership of books causes the pupils to take better care of them than if they are public property. The cost of textbooks is a small proportion of the cost to parents of sending

pupils to high school, and it is reasonable to raise the question whether parents who can board, lodge, and clothe their children throughout a high-school course would find it difficult to meet the further expense for books. An inquiry into high-school elimination shows that pupils buy their own textbooks, and a comparative inquiry made among pupils in a system where books are furnished ought to throw some light on the problem.

The Illinois High-School-Tuition Law

The problem of meeting the tuition of high-school pupils from the outside who attend city high schools has evidently not been solved to the satisfaction of some of the cities concerned. The following quotation from the *Abingdon Kodak* represents the point of view of some of those who find the law imperfect:

> There is much discussion now about the justice or injustice of the new high-school-tuition law which was enacted by the last General Assembly. State Superintendent Francis G. Blair, in a signed article, after vehemently defending the measure, stated: "The law is a just and meritorious measure and should be supported by every school man who takes a broad and unselfish view of public education."
>
> In spite of this appeal to the better spirit of interest in our school system, there are those whose interest in education is just as great who yet cannot feel under obligation to be enthusiastic over the tuition law in its present form.
>
> Rockford, Moline, and other cities have united to contest the law, holding that it is unconstitutional for a city to be required to educate country children in high school for less than it is costing the city itself per scholar attending. This is claimed to be the situation in many cities. The maximum yearly tuition allowed by the law is $50, and it can be limited to less by the county superintendent. The chief objection, however, is because of the method by which the money for the high-school education of country children is paid. The districts maintaining high schools are, it is maintained, obliged to pay a double tax.
>
> Each county gets a certain amount of money from the state tax fund each year for school purposes, and this has heretofore been distributed among the school districts in proportion to the number of the children in the school district. Since the new law went into effect the payment of the tuition of all of the country pupils attending high school is made from the fund before the distribution is made. The result is that the districts having a high school have to help pay for the tuition of pupils in districts which do not maintain a high school, which is in effect a double tax.
>
> There are other flaws also in the law of less vital nature, but it is generally held that the criticism of the double tax feature is just.

Representative J. M. Pace advocated a bill which was introduced in the legislature for country pupils attending high schools to be paid out of proceeds of a tax laid upon the non-high-school territory of the county, which would be organized into a special district for the purpose. This would eliminate the double tax and at the same time distribute the burden of tuition.

Reorganization to Economize Time

A number of experiments have been made with the purpose of amalgamating later elementary-school work with beginning high-school work and thus saving time. Most of these experiments have been made in the West, but the *New York Globe* reports a modest experiment in reorganization of this sort in the New York system:

With the opening of the new term on Monday there was inaugurated in two of the elementary schools an experiment in covering the work of the seventh and eighth years of the elementary course and the first year of the high-school course in two years. It had been intended also to try an experiment in reducing the eight-year course in the elementary schools to seven years. This plan was not put into effect, however, owing to the difficulty encountered by the superintendents in selecting a school where the experiment could be tried under normal conditions. The Board of Education had authorized the experiment in P.S. 166, but Principal Reigart preferred not to conduct it.

The first plan mentioned, however, was introduced in three classes at P.S. 69, West Fifty-fourth Street, Manhattan, and four classes at P.S. 85, Evergreen Avenue, Brooklyn. As the conditions governing the experiment will be as nearly normal as possible, it was decided that the registration in these classes should not exceed 40 pupils. Consequently there will be a total enrolment in these classes of more than 280 pupils. P.S. 69 has nearly its full quota at the present time, and P.S. 85 already numbers 150 pupils in its four classes.

At both schools the course of study in the three experimental classes organized has been so modified as to enable pupils to enter the second year of high school upon completion of the work prescribed. In determining upon this experiment it was decided to try it out in boys' classes only. The regulations governing admission to these classes limited them to boys who are twelve years old or over, who intend to enter classical high school, who are physically strong, who are proficient in scholarship, and whose parents consent to have them make the experiment.

Central Association of Science and Mathematics Teachers

The fifteenth annual meeting of the Central Association of Science and Mathematics Teachers will be held in Chicago in the new building of the Harrison Technical High School on November 26 and 27, 1915.

On the programs of the section meetings in agriculture, biology, chemistry, earth science, home economics, mathematics, and physics are prominent educators who will discuss some of the present-day problems of the secondary schools. In the general sessions addresses will be given by Alexander H. Revell, Chicago, merchant, and director and trustee of numerous educational institutions; William B. Ittner, St. Louis, architect of the Board of Education of St. Louis; Cyril G. Hopkins, professor of agronomy, University of Illinois; Earle R. Hedrick, professor of mathematics, University of Missouri; and Edward H. Steiner, sociologist, Grinnell College, Iowa. All teachers are cordially invited to attend this meeting.

ANNUAL MEETING OF THE NATIONAL COUNCIL OF TEACHERS OF ENGLISH

The Fifth Annual Meeting of the National Council of Teachers of English will be held at the Auditorium Hotel in Chicago, November 25 to 27, 1915. At the general sessions on the mornings of the 26th and 27th addresses will be delivered by E. H. K. McComb, of the Manual Training High School in Indianapolis, Indiana; Percival Chubb, of the Ethical Culture Society in St. Louis; Edwin Mims, professor of literature in Vanderbilt University; John L. Lowes, professor of English in Washington University, and W. N. C. Carlton, librarian of the Newberry Library in Chicago. Section meetings will be held on Friday afternoon and Friday evening for the departments of elementary schools, high schools, normal schools, colleges, the library, and public speaking.

Over forty speakers will take part in the various programs, and every important problem of present-day English teaching will be discussed. Among these are speech-training, newspaper work, inprovement of the library, teaching in versification, formal grammar, reorganization of the normal-school course, speaking contests, and the preparation of college teachers. The work of eleven special committees will be represented, among these being committees on scientific standards and on the labor and cost of English teaching.

The Council is truly national in scope and includes in its membership representatives of English associations in almost every state in the Union. All who are interested in the progress of English teaching in school and college are invited to participate.

BOOK REVIEWS

Working Girls in Evening Schools: A Statistical Study. By MARY VAN KLEECK. New York: Survey Associates, Inc. (Publishers for the Russell Sage Foundation.) 12mo., pp. 258.

This volume is the third in a series of investigations made by the Committee on Women's Work of the Russell Sage Foundation. The two earlier volumes dealt with women in the bookbinding trade and with artificial-flower makers, and described the conditions of work and of pay in those two trades. The volume on *Working Girls in Evening Schools* presents the results of an attempt to secure such information about the girls who had already entered upon wage-earning life, and wished by attendance upon evening classes to increase their efficiency and better their industrial prospects, as would be of service to the Board of Education in improving the organization of the evening schools and in adapting the curriculum to the needs of the wage-earners in New York City.

The method employed in this investigation was that of the questionnaire, to which replies were obtained from more than 1,400 girls and women who were pupils in the evening schools. In addition to these replies, 260 of the pupils were interviewed in their own homes.

Many interesting facts familiar to the student of school organization and of women's place in modern history receive confirmation in this interesting body of testimony given by members of the weakest industrial group to whose needs little consideration has been given by education authorities.

To be sure, the problems of the worker in the evening school are not new ones. Among the oldest of these are the child worker, and the problem of fatigue. In 1865 the superintendent of the New York schools reported that there were every winter from five to six thousand children, some not over eight years of age, registered in the evening schools, many of whom were so weary that they could only sleep in the schoolroom; and in 1866, children under twelve were excluded, although at that time many children younger than twelve were still legally at work in stores and factories. While none under fourteen are admitted to the New York evening schools now, Miss Van Kleeck finds one in every five about whom she secured information[1] to be under sixteen, and many of them[2] spent in work, in evening school, and in going to and from their work and school anywhere from ten to fifteen hours a day.[3]

Obviously, from the point of efficient service to the group under sixteen years of age, the great device to be employed by the evening school is that of

[1] P. 29. [2] P. 64.

[3] Over three-fourths of those for whom information was obtained (76.6 per cent) were under twenty-one years old.

forcing upon the education authorities and through them the community at large the conviction that under sixteen, perhaps under eighteen, years of age all education related to efficiency of workmanship should be counted as part of the working-day and included within the limits set by the child-labor law. This would be in accord with one of Miss Van Kleeck's recommendations.[1] In New York this policy is already authorized by the compulsory school law enacted in 1913.

Another point, of equal importance from the point of view of both boys' and girls' education, is the variety of nationality represented and the extent to which the city evening school must serve those whose elementary training has been received elsewhere. Miss Van Kleeck emphasizes the point made by the brilliant report of the Massachusetts Commission on Immigration[2] that the evening school, presenting as it does problems in the education of the immigrant and of the adult, deserves the best intelligence of the school authorities. A few over a fifth of those giving information were born in the United States.[3] The others came from Russia, Germany, Austria-Hungary, Roumania, Italy, Scandinavia, Great Britain, and other countries. They therefore came from countries and sections of the United States where there was a well-developed system of public education and from countries and portions of our own country where there was little or none. Only when intelligent and thorough study has been made of the problem presented by groups representing such varieties in the kinds and amount of their training can the curricula of the evening schools assume a shape other than haphazard and accidental.

These points bear, of course, equally on the problem of boys and on that of girls. The peculiar difficulty connected with the treatment of girls grows out of the great variety of product in connection with which they are employed, and the widespread lack of skill required for the present task or of opportunity for advancement. Of the girls giving information about themselves, three-fourths were wage-earners, and of these nearly half (46.2 per cent) were in the manufacturing group and nearly half (46.1 per cent) in trade and transportation groups, while only 7 per cent were in domestic and personal service or in the professional groups.[4] That is, they worked in connection with the sewing trades, the candy, box, artificial-flower, bookbinding, and millinery trades, or they were bookkeepers, cash girls, salesladies, or held any one of the innumerable occupations connected with trade or commerce.

Miss Van Kleeck gives[5] a list of over a hundred kinds of products with which their work is related, and points out that some knowledge of the industrial organization issuing in these products is essential to the development of a curriculum adapted to the needs of the workers coming into the schoolroom

[1] P. 165.

[2] "Report of the Commission on Immigration on the Problem of Immigration in Massachusetts," chap. vi, House Document No. 2300 (1914).

[3] P. 22. [4] P. 35. [5] P. 135.

out of so great a variety of experience and of opportunity. She likewise emphasizes the lack of intelligence likely to result from an undue emphasis upon the domestic life which may await many of these girls, but only after a period of wage-earning. And during this period some equipment of an industrial or trade character will make all the difference between independence and dignity on the one hand and helplessness and discouragement on the other.

The study is called a "statistical study." To the student of education, however, the points made are so obvious that statistical confirmation seems hardly necessary. The stories of individual pupils, giving material for effective appeal, the illustrations showing the youth and frailty of these wage-earners upon whom the modern world is allowing heavy burdens to be laid, give a new sense of responsibility to everyone connected with the educational system, which though having millions of eyes has yet failed to see and innumerable tongues has yet failed to persuade the community of the incalculable waste growing out of failure better to safeguard and to develop these minds and bodies, in whose protection and education rests the permanent well-being of the community.

S. P. BRECKINRIDGE

UNIVERSITY OF CHICAGO

West Side Studies. Carried on under the direction of PAULINE GOLDMARK. *Boyhood and Lawlessness; The Neglected Girl.* By RUTH S. TRUE. New York: Survey Associates, 1914. Pp. xix+215 and iii+143. $2.00.

This volume of studies is part of a wider investigation of social and economic conditions on the Middle West Side of New York. *A Historical Sketch* and *Mothers Who Must Earn* complete the set.

The 80 blocks bordering on the Hudson River between 34th and 54th streets, known as the Middle West Side, contains a homogeneous and relatively stable population, originally Irish and German. It does not form a problem in recent immigration, therefore, for a large number of families of the second generation live here, whose parents were born and brought up in the neighborhood. These two studies, the one of 294 boys of this neighborhood, the other of a representative group of 65 girls, bring into striking prominence the inevitable effect upon the youth of both sexes of such pathological social and economic conditions as crowded, unsanitary tenements, lack of play provision of a normal sort, poverty, working mothers, and a long previous tradition of lawlessness and vice. The boys brought up in this environment are unavoidably and inevitably vicious, and finally often criminal. Physically stunted by inadequate nourishment, cigarette smoking, and beer drinking, familiar from infancy with fighting and with immoral practices of various sorts, these boys have no resistance, physical or moral, to temptations of any kind.

The girls here studied are influenced primarily in their development by home conditions. Dire poverty, showing in a high infant mortality, shows even more in the lowered vitality of the girls, in "ignorance, immorality, drinking, filth, degradation" at home. Not so much delinquency as "frustrated and dwarfed development" is the difficulty in the case of the girls. A sympathetic and valuable analysis of the psychology of this type of girls is here contributed. A chapter on the Italian girl brings out the closer kinship bonds in this group and their restraint upon the girl as well as the gradual loosening of the bonds under American influences.

These studies do not attempt to recommend solutions of the problems they analyze. But they do bring out, both implicitly and explicitly, the intricacy of these facts and the failure of our governmental, social, and educational agencies to deal adequately with them. For example, improvement of dance halls does not offset the influence of home and street for the girls. The court has failed even to deal adequately with its individual cases, much less make any constructive or permanent effect upon the neighborhood. Unfortunately, while truancy and the failure of the school law are discussed at some length, the relation of the course of study in detail to the needs of these boys and girls is not discussed.

The volume contains full appendices with tables and discussion of the economic condition of the families.

FRANCES FENTON BERNARD

COLUMBIA, MO.

First-Year Mathematics for Secondary Schools. By ERNST R. BRESLICH. Chicago: The University of Chicago Press, 1915. Pp. xvii+344. $1.00.

The problem of the reconstruction of the secondary-school course in mathematics has been the subject of experimentation in the School of Education of the University of Chicago for many years. No one alive to the situation questions the importance of the problem or the value of this experimentation under test conditions in one of our great educational institutions. The result of this study, a course in fusion mathematics by Ernst R. Breslich, the first volume of which has just appeared from the University of Chicago Press, will command the attention of teachers of mathematics and educators generally. The book, which provides the material for the first year's work in high-school mathematics, is one of the most valuable contributions that have been made in recent years to the remaking and reworking of the traditional subject-matter of education to meet the demands of the age for practicality and psychologic organization. While some of the recent texts in algebra and geometry have added some new material and make slight changes in arrangement, we have in Mr. Breslich's book a bold and fearless attempt at radical reorganization. We feel, as we read it, that in the movement to correlate mathematics, begun

by Professor Myers and now carried forward by Mr. Breslich, we have something worth while and something sure to have a widespread effect in shaping high-school curricula.

As in the first edition of *Secondary Mathematics* by Professor Myers, of which book it is a revision, the simpler facts of algebra, geometry, and trigonometry are presented in their relationships to each other. But it departs in one important respect from the lead of the older book and from established custom in that geometry instead of algebra is stressed in the work of the first year. To the teacher saddened by his failure to secure the initial interest of fourteen-year-old boys and girls in a subject beginning with a treatment of "algebraic processes and expressions," the first chapter of Mr. Breslich's book is a revelation and a joy, providing as it does something to do with ruler and pencil. It may, however, be questioned whether, with so little knowledge of function, the graphic representation of scientific data and their interpretation may not be too difficult for the beginner.

The concept of the function is, however, not here emphasized and the material here is a genetic background for it later. After acquainting the pupil with the usual geometric instruments the rest of the first chapter, containing only 14 pages in all, gives him the mathematical ways of expressing facts about quantity. These ways include the arithmetical, the algebraic, and the graphical or geometric. The exercises employed are vital and modern, not the stereotyped. As with all chapters, at the end of the first chapter there is a tersely stated one-page summary of the essential teachings of the chapter. This is to assist the teacher in supplying a notable lack in American mathematical teaching of frequent synoptical résumés of unities of work covered.

The second chapter, which, with its summary, is 15 pages long, includes graphic and algebraic addition and subtraction, treated together, the former as a space background for the latter, and gives a sufficient treatment of the symbols of aggregation. In this chapter are taught the essential axioms and laws of number, the equation, and a considerable body of geometrical properties and laws of polygons—and it is done without the suggestion of forced correlation. Everything given seems to belong there by right of its power to function there.

Chap. iii, of a dozen pages, is a graphic and unusually attractive discussion of the equation as a tool for solving problems. The problems used are stimulating to boys and girls.

Then comes an 18 page chapter about angles, their geometrical properties and laws, and the application of the equation in deriving principles.

A highly commendable feature is that the equation and the graph both pervade the entire book, and are readily seen to be unifying threads of the year's work.

Space limitations prevent us from detailing further the specific points of merit of the book, and even from giving the chapter headings. The book throughout impresses the critical reader as the text of an actual high-school

teacher, by an actual high-school teacher, for actual high-school pupils and teachers. Nor can one doubt that it is a genuine product of carefully digested classroom experience.

Throughout, an appeal is made to the child's experience. The language, the simple explanation of mathematical terms, the excellent descriptions given of the tools to be used, are all to be commended. A very wise feature is the use of the intuitive proof before the formal proof is given. The portraits and the brief accounts of the lives of the great mathematicians of history give interest as the appeal to the human side, so seldom made in the mathematical classroom, always will. The provision made in the concluding chapter for a complete and systematic review is excellent. The lack of thorough synoptic reviews has been one of the greatest weaknesses of our mathematical instruction.

Perhaps, however, the best feature of the book is in the line of method. There is a conscious effort throughout to help the pupil in his study, to show him, not only the fact, but its importance and how to master it.

Very few school texts are more in harmony with the latest and best in educational theory and practice. It is safe to predict that hereafter fusion mathematics will at least be considered wherever there is an attempt being made to conform to progressive ideas in school administration.

The text is singularly free from typographical errors. The typography and mechanics of the book are a credit to the University Press and furnish a high standard for other textbook firms.

G. O. BANTING
Superintendent of Schools

STOUGHTON, WIS.

BOOK-NOTES

NOTE: Some of these books will be reviewed in detail in later numbers of the *School Review*.

BRUCE, MARY S. *Exercises in French Composition.* Boston: Ginn & Co., 1915. Pp. ix+91. $0.35.

Based on Daudet, *La Dernière Classe* and *Le Siège de Berlin*. With vocabulary.

MOORE, FRANK G. *Porta Latina.* Boston: Ginn & Co., 1915. Pp. xviii+62+lxii. $0.60.

An interesting novelty in second-year reading, comprising the fables of La Fontaine in Latin.

KENDALL, GUY. *Essay Writing.* New York: Longmans, Green, & Co., 1915. Pp. vii+120. $0.60.

A British text.

GIESE, W. F. (ed.). *Alarçon, Novelas Cortas.* Boston: Ginn & Co., 1915. Pp. vi+234. $0.45.

A reading-book in simple Spanish with notes and idiomatic commentary, exercises, and vocabulary.

GREGOR, LEIGH R. *Die Harzreise.* Boston: Ginn & Co. $0.50.

ELLIOT, CHARLES W. *The Training for an Effective Life.* Boston: Houghton Mifflin Co., 1915. Pp. iv+87. $0.35.

This little book is an easily accessible collection of seven addresses by President Elliot, most of them made to new students.

HOWELLS, WILLIAM D. *The Parlor Car and the Sleeping Car.* (Riverside Literature Series.) Boston: Houghton Mifflin Co., 1911. Pp. xii+97. $0.15.

HILL, MABEL, and DAVIS, PHILIP. *Civics for New Americans.* Boston: Houghton Mifflin Co., 1915. Pp. viii+178. $0.80.

This interesting handbook might well be put in the hands of old Americans with as great effect as when placed in the hands of immigrants.

CAJORI, FLORIAN, and ODELL, LETITIA R. *Elementary Algebra.* New York: Macmillan, 1915. Pp. vii+206.

This book attempts to present algebra to beginners by maintaining an intimate connection between algebra and arithmetic. Abstract and theoretical problems are avoided.

PALMER, ARTHUR H. (ed.). *Schiller: Wilhelm Tell.* Revised edition. New York: Henry Holt & Co., 1915. Pp. lxxvii+393.

This excellent text has been revised to include an account of Schiller's life, and over 35 pages of *Fragen* by Professor Purin of the University of Wisconsin. The notes have been rewritten.

MICHELL, ROBERT B. (ed.). *De Bornier, La Lizardière.* New York: Henry Holt & Co., 1915. Pp. xii+253.

The special value of this school edition of *La Lizardière* lies in that fact that the story interprets one phase of the spirit of modern France.

LINDSAY, A. A. *Daily Life Psychology.* Detroit: A. A. Lindsay Publishing Co., 1915. Pp. 99. $1.00.

LEONARD, ARTHUR N. (ed.). *Baumbach: Die Nonna.* New York: Henry Holt & Co., 1915. Pp. vii+150.

MCPHERSON, WILLIAM, and HENDERSON, WILLIAM E. *Laboratory Exercises to Accompany First Course in Chemistry.* Boston: Ginn & Co., 1915. Pp. 128. $0.60.

HOOD, GEORGE W. *Laboratory Manual of Horticulture.* Boston: Ginn & Co., 1915. Pp. vi+234. $1.00.

WETENHALL, LOUISE. *Practical Laundry Work.* New York: E. P. Dutton. Pp. viii+172. $1.00.

Crude illustrations are the only flaw in an excellent manual.

PALMER, BEN. *Swamp Land Drainage with Special Reference to Minnesota.* The University of Minnesota Studies in the Social Sciences, No. 5. Minneapolis, 1915. Pp. iv+138.

CALDWELL, EIKENBERRY, and PIEPER. *A Laboratory Manual for Work in General Science.* Boston: Ginn & Co., 1915. Pp. xi+134. $0.50.

To accompany Caldwell and Eikenberry's *Elements of General Science.*

LINCOLN, LILLIAN I. *Every Day Pedagogy.* Boston: Ginn & Co., 1915. $1.00.

Deals with school organization and management, the principles of teaching, and the presentation of common-school subjects. Discussion with special reference to rural schools.

STEPHENSON, HENRY T. *The Study of Shakespeare.* New York: Henry Holt & Co., 1915.

Presents the social conditions that obtained at the time the plays were written. Criticisms of the plays are included.

KLAPPER, PAUL. *The Teaching of English.* New York: D. Appleton & Co., 1915. $1.25.

An extremely useful book for normal schools, giving special courses in the teaching of English. It deals with elementary-school problems only.

FAULKNER, RICHARD B. *The Tonsils and the Voice.* Boston: Ginn & Co., 1915. $2.00.

Dr. Faulkner brings together a wide range of scientific knowledge concerning the anatomy of the vocal organs, the science of the vocal arts, the hygiene of the voice, and the principles of treatment. The book is timely in view of the increasing interest in all matters concerning the American speaking voice.

BOEZINGER, BRUNO. *Erstes Aufsatzbuch nach der direkten Methode.* New York: Henry Holt & Co., 1915.

An excellent text for high-school classes.

HANEY, JOHN LOUIS. *Good English.* Philadelphia: Edgerton Press. 1915. $0.75.

A reference book discussing more than one thousand colloquial words and phrases.